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DECISION SUPPORT SYSTEMS: THEORY

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## EXECUTIVE SUMMARY

The purpose of this project was to research, collect, and evaluate all available information on Decision Support Systems (DSS) Theory. A biographical search resulted in over 600 articles, books and other documents directly and indirectly related to DSS. This bibliography is included at the end of this report. The report is based on reading and evaluation of between 75 and 85 separate documents from the bibliography.

*DSS are interactive, conversational computer systems supporting decision makers. DSS rely heavily on human intuition, judgement, and experience as an integral part of the decision process. DSS designers emphasize the interfacing mechanisms between the decision maker and the computer. Terms characterizing DSS include: computer-based, interactive, conversational, flexible, adaptable, convenient, quick, helpful, and reliable. Color graphics terminals, light pens, joy sticks, digitizer pads, and similar devices usually replace or augment the typewriter terminal in the design of DSS to enhance the man-machine interface.*

DSS design draws on three important methodologies: Operations Research and Management Science (OR/MS), Computer Science, and Behavioral Science. DSS utilizes the modelling and analysis techniques of OR/MS to identify and evaluate alternative courses of action. Computer Science contributes the necessary expertise in information storage, processing, and retrieval. Finally, DSS design accounts for those elements of individual and group behavior to ensure the best utilization of the decision maker in the interactive decision making process and acceptance by the decision maker and the organization of the DSS.

DSS is not a separate science; it is an idea whose time has come. Namely, that by combining the computer's computational power with the decision maker's intuition and judgement in an interactive manner, better decisions will result than by either the computer or human taken separately.

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## 1. INTRODUCTION

### 1.1 Purpose

The United States Army Institute for Research in Management Information and Computer Science (AIRMICS) contracted with the School of Industrial and Systems Engineering at the Georgia Institute of Technology to research and collect all available information in Decision Support Systems (DSS). The information was to include all past, current, and proposed research. This report discusses the results of that activity as well as a requested evaluation of the information in relation to the Management Information Systems mission of the U. S. Army Computer Systems Command.

Activities within this contract focused on DSS Theory. A separate contract, with Dr. Lesley G. Callahan as principle investigator, was intended to focus on DSS applications.

### 1.2 Methods

After extensive meetings with AIRMICS personnel, a comprehensive bibliography search was initiated. This activity continued throughout the contract period. It included a library search, and contact with organizations and individuals involved in DSS activities. The bibliographical search produced over 600 titles, including several books. The complete bibliography appears at the end of this report. While the bibliographical search continued, a companion activity was initiated. This consisted of reading and evaluation of approximately a dozen books and major articles on the subject of DSS. This evaluation produced a second list of 50-60 documents which appeared to be important to the development of DSS. These documents were read and evaluated, and they, in turn, pointed to other documents. In total, between 75 and 85 separate documents were read and evaluated.

A second major activity included visits to U. S. Army installations and agencies. Discussions were held with personnel at (1) Fort Lee, Virginia, (2) Military Personnel Center (MILPERCEN) in Alexandria, Virginia, and (3) USAMSSA in the Pentagon in Washington, D. C. These discussions centered on the nature of DSS and its potential for application within the U. S. Army and their own particular activities.

### 1.3 Organization of the Report

Chapter II gives several definitions of DSS and some of its distinguishing characteristics. In Chapter III, the concept and structure of a DSS is outlined. Chapter IV presents conclusions and recommendations. An extensive bibliography of DSS literature is presented at the end of this report.

## 2. DEFINITIONS AND CHARACTERISTICS OF A DECISION SUPPORT SYSTEM

### 2.1 Evolution of DSS

During the period from the late 1950's through the early 1970's rapid success was achieved in the use of the computer in decision making activities. As computers became larger and more sophisticated, more complex decision making tasks were turned over to them. Often, when the computer could not be programmed to make the decision, it could be utilized to produce large volumes of information which a human could use in reaching his decision.

By the early 1970's a few notions had become apparent. First, the volume of information computers were generating had exceeded the capacity of humans. Decision makers were being presented boxes of printouts, even though it was obvious to all concerned that they wouldn't look at more than a few numbers.

The second observation was slower in crystallizing. Breakthroughs in computerized (as opposed to computer aided) decision making were occurring less frequently. In short, the computer had about reached its saturation point in replacing man's decision making activities. And yet, many decision making activities remained virtually untouched by the computer.

Beginning in the late 1960's computer scientists and users were examining the feasibility of interactively linking the "intuition, judgement and experience" of the human with the computational power of the computer to achieve even greater heights in decision making. Out of this single idea was born the field of *Decision Support Systems*.

### 2.2 A Problem Class for DSS

Simon (1960) developed a distinction between "programmed" and "non-programmed" decisions. Keen and Morton (1978) modified these terms to "structured" and "unstructured" to free them from an implied computer environment; they also added an intermediate term, "semistructured" decisions.

Structured Decisions "...do not involve a manager. ...the decision is well enough understood to have been given to clerks or ...automated through the computer."

Semistructured Decisions involve some judgement and subjective analysis, but this alone is not adequate, due to problem size or computational complexity.

Unstructured Decisions "...are those that are either not capable of being structured or that have not yet been examined in depth and so appear to the organization as unstructured."

Semistructured decisions provide a natural class for application of DSS. A combination of the human's judgement and the computer's computational power can extend the human's effectiveness in such decision making activities.

Anthony (1965) developed three categories of managerial activities - strategic planning, management control, and operational control. Although, for DSS, this distinction seems much less important, since DSS has applications in each activity so long as the decision is semistructured.

Donovan and Madnick (1976) categorize DSS into two types: *institutional* and *ad hoc*. Institutional DSS, currently the most common, are those supporting repetitive or recurrent decisions. Ad hoc DSS, currently few in number, support decisions which occur infrequently or are not usually anticipated.

### 2.3 Some Definitions of a DSS

Much of the initial focus and direction in DSS was provided by Professor Peter C. W. Keen, Michael S. Scott Morton and their students; as well as Eric D. Carlson and his colleagues. Figure 2.1 presents some of the definitions which have evolved from this early work.

By examining the words separately, one might accept the erroneous conclusion that DSS consists of any system which supports decision making activities. This definition is far too broad and, as can be seen from examination of Figure 2.1, is not intended by researchers and practitioners in the field.

#### *DSS Involves Computers*

Virtually all the definitions include the term computer in them. Even McCosh and Morton limit their focus to computer systems. The computer is there for its computational power - including data searching and reduction, modelling and analysis, and informational display. In many ways, in a DSS, the computer can be viewed as a powerful calculator.

#### *DSS Involves Humans*

Such terms as *support*, *assist*, *meet with*, *extend*, *aid*, and *help* imply the use of the human component (Manager, Decision Maker) as a part of the DSS. Current state-of-the-art computers still cannot model human intuition, judgement and experience. However, careful design of a DSS, involving both the human and the computer, which accounts for the abilities of the human and the computer, can extend the capabilities of both.

#### *The Linkage is Important*

DSS is serious in its attempt at integration of the human and computer components into a single system, and thus the linkage is important. Such terms as *flexible*, *interactive*, *conversational*, and *relevant information* become significant.

Emphasis is placed on the human ability to transmit, receive and process information. Computer transmissions employ charts and graphs instead of tables, limited amounts of information, color coded and spatial displays, etc. Human transmissions occur in english-like commands, or through flexible control devices such as light pens or joy sticks, etc.

By far and away, the greatest concern in the design of a DSS is the linkage



1. "A COMPUTERIZED SYSTEM WHICH IS DESIGNED SPECIFICALLY TO HELP MANAGERS MAKE DECISIONS". (ALTER, 1975)
2. "INTERACTIVE, COMPUTER-BASED SYSTEMS WHICH ARE DESIGNED TO AID PROFESSIONAL DECISION MAKERS IN SOLVING UNSTRUCTURED PROBLEMS". (GRACE, 1976)
3. "THE FLEXIBLE SUPPORT OF DECISION MAKERS WITH COMPUTER-BASED INFORMATION". (CARLSON & MORTON, introduction to Carlson, 1977)
4. "COMPUTER SYSTEMS DESIGNED TO MEET WITH MANAGER'S EXISTING ACTIVITIES AND NEEDS WHILE EXTENDING THEIR CAPABILITIES". (KEEN & STABELL, introduction to Keen & Morton, 1978)
5. "THE USE OF COMPUTERS TO:
  1. ASSIST MANAGERS IN THEIR DECISION PROCESS IN SEMISTRUCTURED TASKS.
  2. SUPPORT, RATHER THAN REPLACE, MANAGERIAL JUDGEMENT
  3. IMPROVE THE EFFECTIVENESS OF DECISION MAKING RATHER THAN ITS EFFICIENCY". (KEEN & MORTON, 1978)
6. "SUPPORTING THE DECISION PROCESSES OF MANAGERS WITH FLEXIBLE ACCESS TO MODELS AND RELEVANT INFORMATION". (MCCOSH & MORTON, 1978)
7. "INTERACTIVE, CONVERSATIONAL COMPUTER SYSTEMS SUPPORTING DECISION MAKERS". (JARVIS, 1978)

FIGURE 2.1 SOME DEFINITIONS OF A DECISION SUPPORT SYSTEM

between the human and the computer.

#### 2.4 Some Characteristics of a DSS

Examining the definitions in Figure 2.1 and the variety of applications typified by the bibliography, we are able to identify a set of basic characteristics possessed by most DSS's. One such list of characteristics is presented in Figure 2.2. We shall discuss each characteristic in turn, and indicate how it relates to DSS.

Computer-Based - As already indicated, DSS implies the use of a computer.

Interactive - The human is involved in the system. Further, the human role is active (guiding, controlling) rather than passive (observing).

Conversational - The human uses english-like commands to operate the DSS.

Flexible - The DSS is able to operate under different control sequences. That is, the human is able to combine the different modules of the DSS in various ways in processing various problems. The DSS is able to process abbreviated commands as the human learns the communication language.

Adaptable - The DSS is somewhat dynamic; capable of changing or being easily changed as the decision environment changes. New modules are easily added.

Convenient - It doesn't require the human to input volumes of data during operation. It uses existing data sets whenever possible. It accepts abbreviated input, menu selection formats, digitizer pad data, so as to reduce the human burden.

Quick - The DSS operates within an environment of fast access and turnaround. Typically DSS's are operational on time-shared computers or dedicated mini computers.

Helpful - It requires limited external documentation to operate the DSS. It can "help" the human when he/she doesn't remember a command or can't remember what to do next. It is polite, forgiving, and guides the user out of mistakes.

Reliable - The DSS is free of bugs; it recovers from human error. The computer hardware is not prone to breakdown.

- COMPUTER-BASED
- INTERACTIVE
- CONVERSATIONAL (ENGLISH-LIKE COMMANDS)
- FLEXIBLE
- ADAPTABLE (DYNAMIC)
- CONVENIENT (DATA INPUT)
- QUICK (ACCESS AND TURNAROUND)
- HELPFUL (LIMITED EXTERNAL DOCUMENTATION REQUIRED)
- RELIABLE (HIGH SYSTEM INTEGRITY)

FIGURE 2.2 CHARACTERISTICS OF A DECISION SUPPORT SYSTEM

### 3. STRUCTURE OF A DECISION SUPPORT SYSTEM

#### 3.1 Concept of a DSS

Figure 3.1 illustrates the basic concept of a DSS. On the one hand, we have the decision maker. The decision maker has certain goals and objectives within the environment in which he/she operates. This, together with his/her intuition, judgement, and experience, establishes the human component.

The other major component is the DSS, itself. It is normally operational within a computer environment. It has data available to it, either its own or else data available from some other data base. In addition, the DSS possesses its own information processing activities, including data reduction, modelling, and analysis. These activities are often highly sophisticated, although there are divergent points-of-view in this respect.

Some DSS designers argue that the manager/decision maker will not utilize a DSS which employs sophisticated information processing components. These designers prefer rules-of-thumb, graphs, tables, and other intuitive procedures to complex linear programming models, and the like. The thinking is that the decision maker doesn't trust something he doesn't understand. This is only partly true.

First, managers/decision makers will come to trust something which they have seen "work" many times, even though they don't understand it. A good example is the automobile. Many people use it without knowing why it works. Second, many DSS designers argue that managers/decision makers being produced by current university programs, are much more knowledgeable in the use of sophisticated decision models.

An outside factor in the design and operation of the DSS is the environment within which the decision maker operates. This environment includes his/her superiors and their reaction to computer based decision making. The usual pattern of DSS development is that the process is initiated by a casual request for help in some decision making activity. From this point on, the DSS designer charges, full steam ahead, with a grandiose system in mind. This is often a mistake. If the decision maker and environment are not highly receptive to computer methods, it is better to begin slowly, producing a series of small successes while gaining the confidence of all concerned.

#### 3.2 Structure of a DSS

Burch and Strater (1974) identified five basic activities (functions) associated with an effective information system. These are (1) interrogation, (2) modelling, (3) filtering, (4) monitoring, and (5) externally. We may also employ these terms (slightly modified) to describe the basic structure of a DSS. Brief descriptions of each are:

Interrogation - Interaction between the human and the DSS. Either the

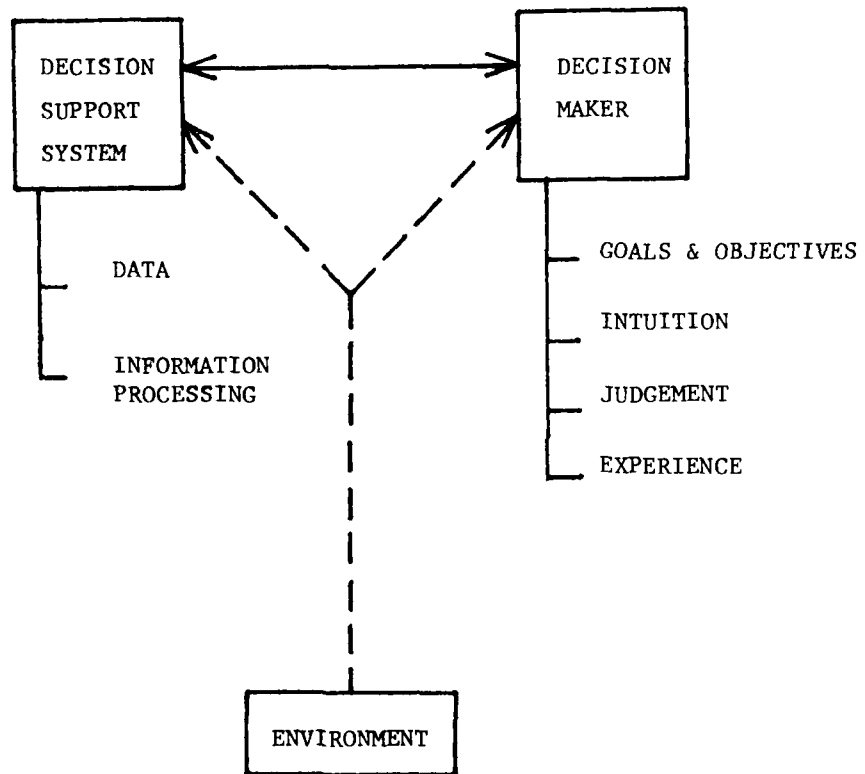


FIGURE 3.1 CONCEPT OF A DECISION SUPPORT SYSTEM

human and the DSS may request information from (initiate) or provide information to (react) the other.

Modelling - the process of employing mathematical or computer models (eg., linear programming, simulation, queueing, heuristics, artificial intelligence, other algorithms) to develop strategies and information.

Filtering - reducing, summarizing, aggregating, and otherwise combining (in a less sophisticated manner than modelling) data into information. Examples include means, variances, plots, bar charts, etc.

Monitoring - continuously observing the data and provide informational comments to the decision maker on an automatic basis. An example might be, "THE MACHINE UTILIZATION RATIO EXCEEDED 75% THIS PERIOD!"

Gathering - the process of obtaining data from sources external to the DSS. Sources include other parts of the organization or outside the organization.

In Figure 3.2 we have utilized these terms in the design of the elements of a DSS. Carlson (1976) refers to the data base exhibited in Figure 3.2 as an "extracted" data base compiled from relevant sources (in the decision maker's view).

#### *Intermediaries*

It is not essential that the decision maker interact directly with the DSS. Some decision makers, particularly high-level managers, will not spend time doing anything except reading executive summaries. They are going to delegate responsibility for developing recommendations to others in the organization, who will interact directly with the DSS. These "others" are called *intermediaries* in the DSS literature.

### 3.3 Interfacing is the Key to DSS

In addition to the obvious emphasis on giving the decision maker exactly what he/she needs, no more and no more less, the greatest concern in DSS is in how he/she gets it. More generally, the greatest single emphasis in DSS is on the interface between the human and the computer.

The DSS designer is intently involved in expanding the range of man-machine communications devices beyond the basic typewriter terminal, card reader, and printer. Because humans can process complex patterns of information, DSS designers are currently attracted to graphics terminals. Such devices can employ colors, flashing backgrounds, lines and points to produce complex graphs, scatter plots, bar charts, etc., as well as basic alpha numeric data.

DSS designers are equally concerned with freeing the decision maker from expending a great amount of effort to input commands and information into the computer. Devices like light pens, touch panels, joy sticks, and track balls, are used to provide menu choices, positional information, and the like. Figure 3.3 illustrates the current range of interfacing mechanisms which may be employed between the human and the computer. DSS designers attempt to optimally utilize as many of the different mechanisms as possible.

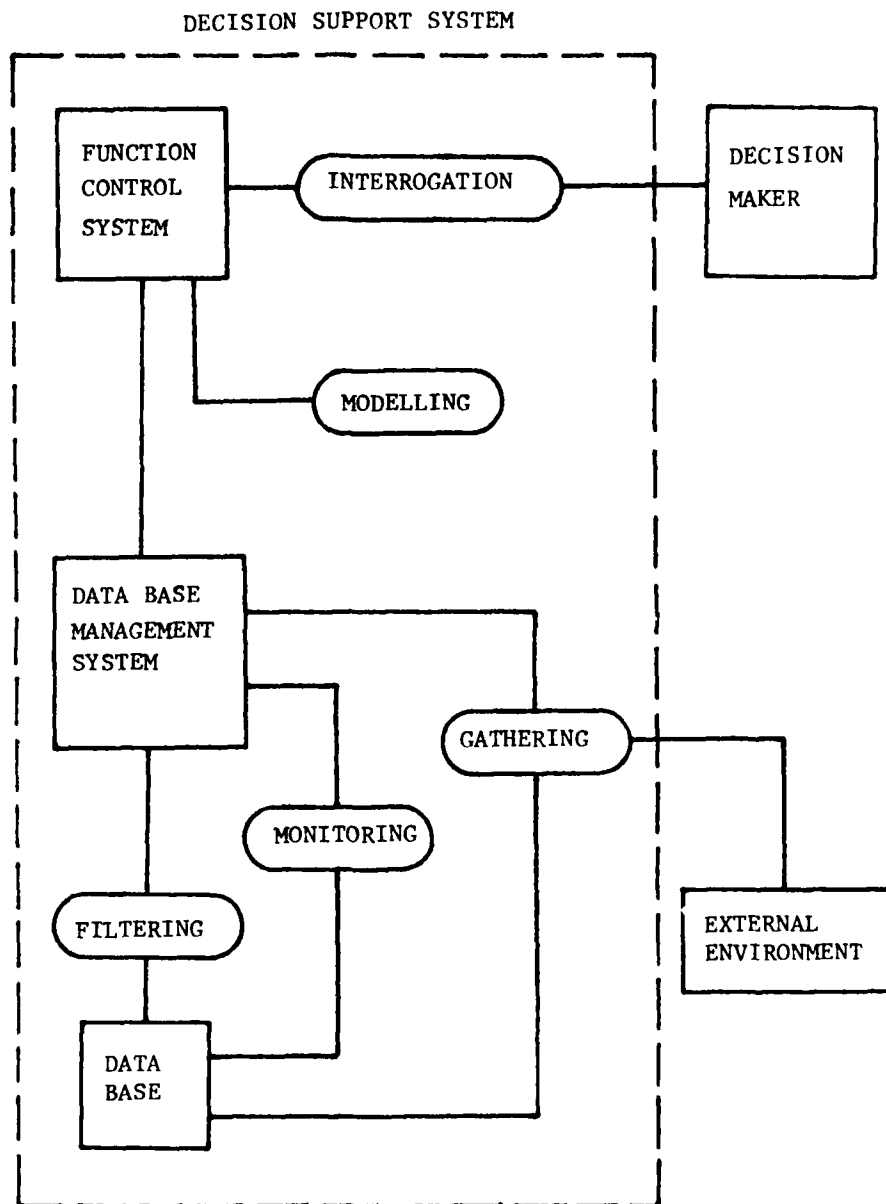


FIGURE 3.2 STRUCTURE OF A DECISION SUPPORT SYSTEM

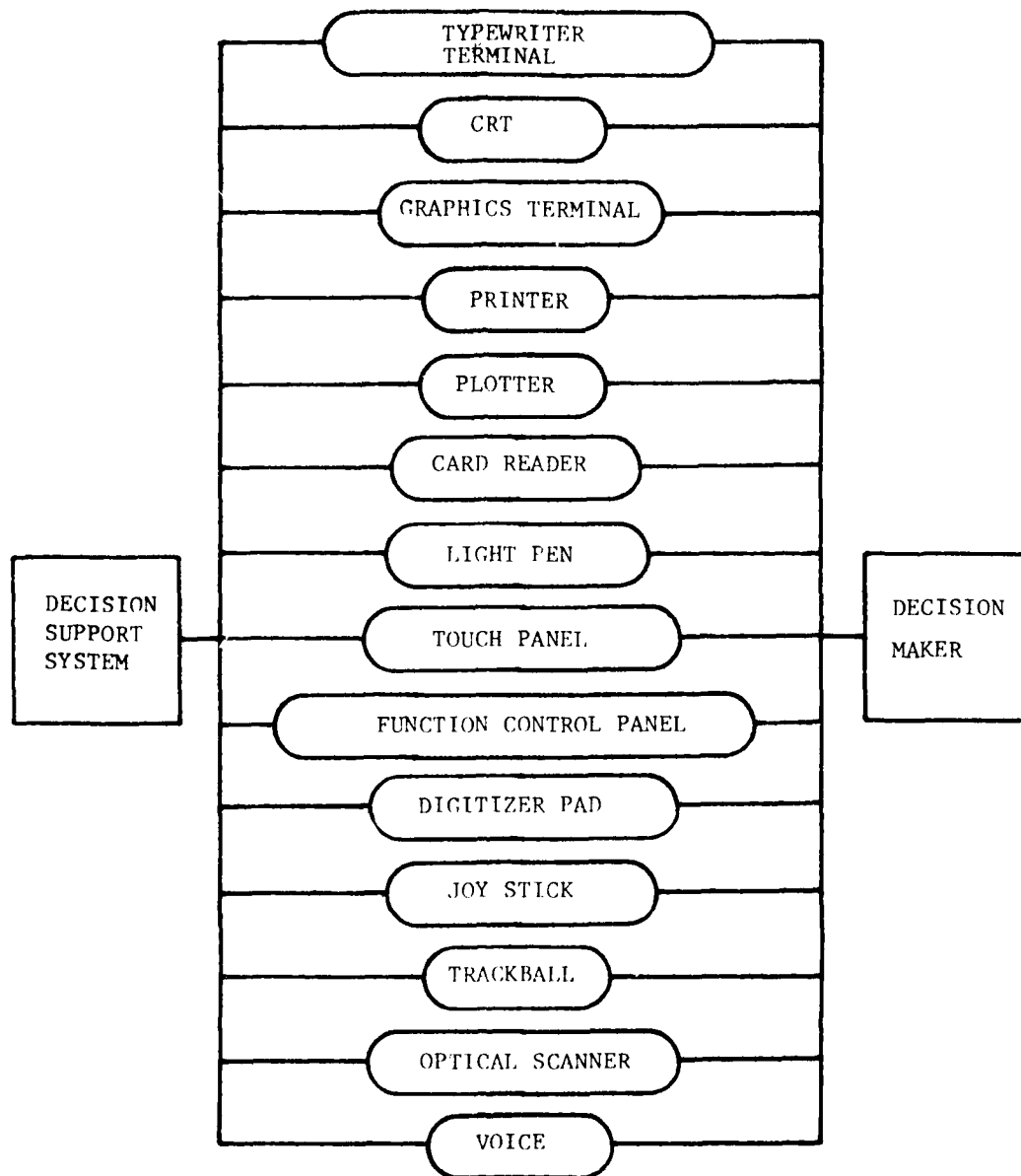


FIGURE 3.3 INTERFACING MECHANISMS FOR A DECISION SUPPORT SYSTEM



often employing several of these interfacing methods in the same DSS.

### 3.4 DSS Draws on Other Methodologies

Decision Support Systems development draws on three other important areas: (1) Operations Research/Management Science, (2) Computer Science, and (3) Behavioral Science. Each of these sciences contributes significantly to the design of a DSS. We shall briefly discuss each area and the contribution it makes.

#### *Operations Research/Management Science*

Operations Research and Management Science (OR/MS) have historically emphasized the development and use of mathematical and computer models and methods in problem solving and decision making. Considerable emphasis has been placed on (1) improving our ability to develop more realistic models of the decision making environment, and (2) developing efficient algorithms and computer codes for analyzing larger and more complex models. The ultimate goal of OR/MS has been to supply the decision maker with "optimal" or "good" courses of action which are realistic relative to the limitations and constraints on the particular decision situation.

The methods developed by OR/MS may generally be classified into two areas: descriptive and prescriptive. Descriptive methods attempt to present (describe) characteristics of the decision situation (system) when a particular course of action is selected. Good examples of such methods are queueing and simulation.

Prescriptive methods attempt to specify (prescribe) the "best" course of action available among a number of choices. Two major prescriptive areas are optimization and heuristics. Optimization methods produce the very best strategy or course of action given the conditions of the model. Heuristics attempt to produce good solutions given the conditions of the model.

Obviously an extensive repertoire of useful OR/MS models and methods will be available in a DSS. These models are usually modularized so that the decision maker can combine them in different ways depending on the decision situation and on the results at each step of the process.

#### *Computer Science*

Computer Science has historically emphasized the information storage, processing and retrieval aspects of problem solving and decision making. This emphasis has occurred in both the hardware and software areas.

Computer hardware has improved continually since its initial introduction. Computers have become larger - including more central memory, and greater amounts of disc and other peripheral memory. At the same time, computers have become increasingly faster - in processing central memory and in communication between central and peripheral memory. Both advances in time and speed have enabled decision makers to process greater amounts of data and to analyze larger models of the decision situation.

Computer science has also concentrated on information storage and retrieval. Such concepts as list processing and search methods have come out of this concentration. This has also tended to be the historical focus of those researchers and practitioners of Management Information Systems (MIS). That is, they have concentrated on efficient data base design and handling methods.

Finally, considerable effort in Computer Science has been directed toward development of Artificial Intelligence. The general idea behind artificial intelligence is to provide the computer with the ability to "learn" from its experience in a particular situation so that it can expand its ability. Two significant areas of concentration have occurred in theorem proving and game playing. An example in game playing involves computers playing chess with humans or other computers, and improving their ability to play from their experience in each game. While not currently too practical, Artificial Intelligence has obvious future benefits in DSS.

#### *Behavioral Science*

Behavioral Science is concerned with the behavior (actions and interactions) of individuals and groups. The ultimate success of any DSS depends on an awareness of the human decision maker and the organizational environment. Several areas of Behavioral Science are central to DSS design and implementation.

Individual and group psychology is important to DSS. What will an individual/group accept or reject? What situations make a DSS comfortable or uncomfortable? These are important research areas, even though they are often overlooked. For example, most high-level managers reject the use of a typewriter, but they will accept the use of a function keyboard (it usually looks like a calculator). What kinds of interpersonal relationships are established during group decision making and in what ways will this affect the outcome?

Human Engineering issues are clearly significant. How much information can a human reasonably process? What formats are best - tables or figures? How many colors can be used? How many different interfacing devices can a human handle simultaneously? We can continue indefinitely generating such relevant questions for human engineering in DSS.

Researchers into the implementation process obviously provide insight into how innovation in organizations occur. Such research results can suggest reasonable strategies for DSS implementation in the decision making process. Also, greater knowledge of the cognitive process, through which individual decision makers arrive at decisions, may suggest (1) ways to design DSS so that they are more acceptable to decision makers, and (2) DSS designs which reflect the particular cognitive process of a decision maker.

#### *Synthesis of These Three Methodologies Into DSS*

DSS attempts to integrate the significant decision making aspects of the three methodologies of Operations Research/Management Science, Computer Science, and Behavioral Science. In review, these elements are:

OR/MS - Modelling and analysis.

Computer Science - Information storage, processing and  
retrieval.

Behavioral Science - Individual/group decision making  
behavior.

Figure 3.4 illustrates the methodologies involved in DSS design, development, and implementation.

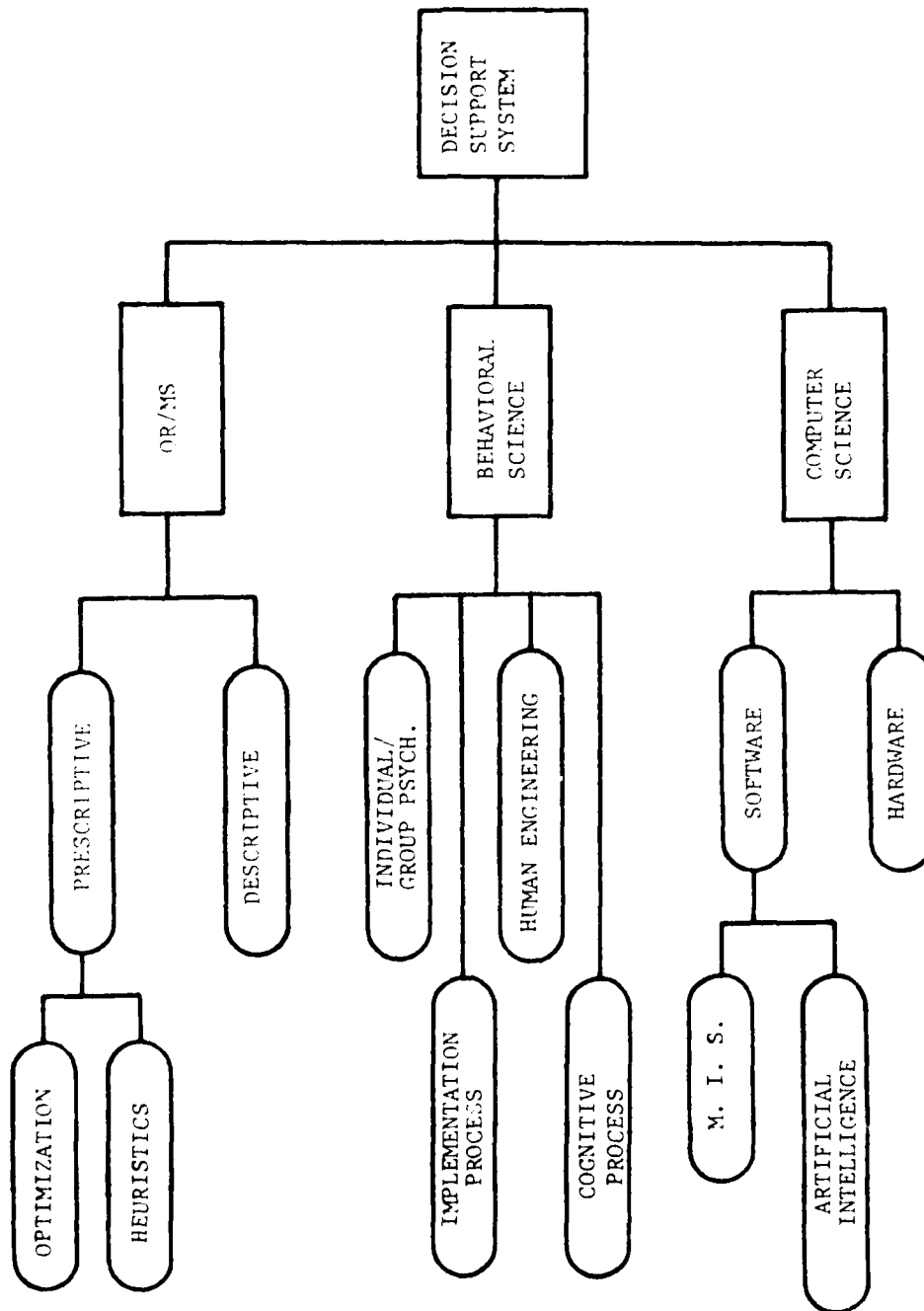


FIGURE 3.4 METHODOLOGIES BEHIND A DECISION SUPPORT SYSTEM

## 4. CONCLUSIONS AND RECOMMENDATIONS

### 4.1 Conclusions

A number of conclusions may be drawn from this study. Some of these are:

- (1) Decision Support Systems (DSS) are interactive, conversational computer systems supporting decision makers.
- (2) DSS emphasize the human-computer interface in decision making and problem solving.
- (3) DSS rely heavily on human judgement, intuition, and experience.
- (4) DSS are characterized by such terms as: computer-based, interactive, conversational, flexible, adaptable, convenient, quick, helpful, and reliable.
- (5) DSS development draws on three other important areas: modelling and analysis from Operations Research/Management Science; information storage, processing, and retrieval from Computer Science; and individual/group decision making behavior from Behavioral Science.
- (6) DSS is an outgrowth of the evolution of technologies in Computer Science, Operations Research, Management Science, and Behavioral Science.

### 4.2 Recommendations

These study results point to several recommendations for continued development of DSS. They include:

- (1) An analysis of the models and methods from OR/MS useful in DSS.
- (2) A Human Engineering analysis of the opportunities and limitations for human-computer interaction in DSS development.
- (3) An analysis and evaluation of the implementation process in the Behavioral Science literature with the goal of developing an approach for DSS.
- (4) An evaluation of the Computer Science/Management Information Systems literature of information storage, processing and retrieval useful for DSS design.
- (5) An evaluation of the available interfacing hardware and software useful in DSS design.
- (6) A field test in one or more Army installations to evaluate DSS methods and designs.
- (7) An evaluation of the essential team characteristics for successful DSS implementation. (This comes from the recognition that an individual's objectivity is often marred by his/her advocacy!)

## BIBLIOGRAPHY

- Abrams, John W. et. al., "Commentary on 'The Researcher and the Manager: A Dialectic of Implementation'," *Management Science*, Vol. 12, No. 2, October 1965.
- Ackoff, Russell L. and Sasieni, Maurice W., *Fundamental of Operations Research*, Wiley, New York, 1968.
- Ackoff, Russell L., "Unsucessful Case Studies and Why," *Opns. Res.* 8, 259-263, 1960.
- Ackoff, Russell L. Some Unsolved Problems in Problem Solving," *Opnal. Res. Quart.* 13, 1-11, 1962.
- Ackoff, Russell L., "Towards A behavioral Theory of Communication," *Management Science*, Vol. 4, 1958.
- Ackoff, Russell L., With the collaboration of Shiv K. Gupta and J. Sayer Minas, *Scientific Method: Optimizing Applied Research Decisions*, John Wiley and Sons, New York, 1962.
- Ackoff, Russell L., *Science in the Systems Age*", *Wharton Quarterly*, Vol. 2, #2, pp. 8-13, 1973.
- Ackoff, Russell L., (ED.), *Progress in Operations Research*, Vol, 1, John Wiley and Sons, 1961.
- Ackoff, Russell L., "Management Misinformation Systems," in J.DEARDEN, F. MCFARLAN, AND W. ZANI (eds.), *Managing Computer-Based Information Systems*, Richard D. Irwin, Homewood, Illinois, 1971.
- Ackoff, Russell L., "Management Misinformation Systems," *Management Science*, Vol. 14, No. 4, December 1967.
- Ackoff, Russell L. , "Frontiers of Management Science," *The Bulletin of TMS*, Vol. 1, No.2, pp. 19-24, 1954.
- Ackoff, Russell L., *The Design of Social Research*, University of Chicago Press, Chicago, 1953.
- Adorno, T.,Freinkel-Brunswik, E., Levine, D. and Sanford, R., *The Authoritarian Personality*, Harper and Row, New York, 1950.
- Aparwal, S. K., "Optimizing Techniques for the Interactive Design of Transportation Networks Under Multiple Objectives," Ph.D. Dissertation, Northwestern University, Evanston, Illinois, 1973.
- Aitchison, *Choice Against Chance*, Addison-Wesley, Reading, Mass., 1970.
- Alderson, Wroe, "Commentary", pp. B6-B9 in Churchman and Schainblatt, 1965.

Allison, G. T., *Essence of Decision*. Boston: Little, Brown, 1971.

Alloway, Robert, "Application of a Contingency Model of Temporary Management Systems to the Creation of Computer Based Systems", paper presented at the Conference on the Implementation of Computer Based Decision Aids, MIT, Cambridge, Mass, 1975.

Allport, G. W. , Vernon, P. E. and Lindzey, G., *Study of Values*, Houghton-Mifflin, Boston, 1960.

Alter, S. A. , "A Study of Computer-aided Decision Making in Organizations." Ph.D. Dissertation, Sloan School, M. I. T., 1975.

Alter, S. A., "Why is Man-Computer Interaction Important for Decision Support Systems?" *Interfaces*, Vol. 7 No. 2, February 1977.

Ambrozy, Denise "On Man-Computer Dialogue", International Journal of Man-Machine Studies, Vol. 3, #4, pp. 375-383, 1971.

Amstutz, A. E., "The Marketing Executive and Management Information Systems." In R. M. Hass (ed.), *Science, Technology and Marketing*, pp. 69-86. Chicago: American Marketing Association, 1966.

Andreoli, P., and J. Steadman. "Management Decision Support Systems: Impact on the Decision Process." Master's thesis, M. I. T., 1975.

Andrus, R. R., "Approaches to Information Evaluation." *Michigan State University Business Topics*, Vol. 19, No. 3, pp. 40-46, 1971.

Anshem, M., "The Management of Ideas, " *Harvard Business Review*, pp. 99-107, 1969.

Ansoff, B. H. I., *Business Strategy*. London: Penguin, 1968.

Ansoff, B. H. I., "Making Effective Use of Computers in Managerial Decision Making", *AutoMation*, Oct. 1967, pp. 68-73, 1967.

Ansoff, B. H. I. and Robert Hayes, "Role of Models in Corporate Decision Making", pp. 131-162 in M. Ross, ed., *OR'72*, North Holland Publishing Company, 1973.

Anthony, R. N., *Planning and Control Systems: A Framework for Analysis*. Cambridge, Mass,: Harvard University Graduate School of Business Administration, *Studies in Management Control*, 1965.

Argyris, C. "How Tomorrow's Executive Will Make Decisions, " *Think*, 33(6), pp. 18-26, 1967.

Argyris, C., "Interpersonal Barriers to Decision -Making," *Harvard Business Review*, Vol. 44, No. 2, pp. 84-97, 1966.

Argyris, C., "Interpersonal Competence and Organizational Effectiveness, R. D. Irwin and Co., 1962.

- Argyris, C., *Integrating the Individual and the Organization*, John Wiley, 1964.
- Argyris, C., "Management Information Systems: The Challenge to Rationality and Emotionality." *Management Science*, Vol. 17, No. 6, pp. B275-292, 1971.
- Argyris, C., "MIS: The Challenge to Rationality and Emotionality", *Management Science*, Vol. 17, #6, pp. B275-292, 1971.
- Argyris, C., *Organization and Innovation*, R. D. Irwin, Inc., 1965.
- Argyris, C., *Personality and Organization*, Harper and Row, 1957.
- Argyris, C., "Resistance to Rational Management Systems." *Innovation*, No. 10, pp. 28-34, Nov. 1970.
- Argyris, C., "Today's Problems With Tomorrow's Organizations," *Journal of Management Studies*, Vol. 4, No. 1, pp. 31-55, 1967.
- Asch, S. E., "Effects of Group Pressure Upon the Modification and Distortion of Judgment," in *Groups, Leadership, and Men*, H. Guetzkow, ed., Carnegie Press, Pittsburgh, 1951.
- Averch, H. A., "An Overview of Some Federal Modeling Activities", paper presented at the Nov. 1974 TIMS conference, 1974.
- Babad, J. M. "The Monetary System-Implementation and Experience: A Case Study." In P. G. W. Keen (ed.), *The Implementation of Computer-Based Decision Aids*. Cambridge, Mass.: Proceedings of a Conference Sponsored by the Center for Information Systems Research, M. E. T., April 3-5, 1975.
- Bailey, Earl, *Computer Support for Marketing: Progress Report, Experience in Marketing #22*, New York: The National Industrial Conference Board, 1969.
- Bales, Robert and Strodtbeck, Fred, "Phases in Group Problem Solving," *Journal of Abnormal and Social Psychology*, Vol. 46, pp. 485-495, 1951.
- Bardach, E., *The Implementation Game: What Happens When a Bill Becomes Law*. Cambridge, Mass.: M. I. T., 1977.
- Bariff, M. L., and E. J. Lusk. "Cognitive and Personality Tests for the Design of Management Information Systems." *Management Science*, Vol. 23, No. 8, pp. 820-829, April 1977.
- Barnett, C. C. and Associates, *The Future of the Computer Utility*. New York: American Management Association, 1967.
- Batchelor, James H., OR, *An Annotated Bibliography*, St. Louis University Press, St. Louis, Vol. 1, 1959, Vol. 2, 1962.
- Beer, S. *Platform for Change*. New York: Wiley, 1975.
- Bean, A. S., et al. "Structural and Behavioral Correlates of the Implementation of Formal OR/MS Projects: Success and Failure in U. S. Business Organizations." Paper presented at the Research Conference on the Implementation of OR/MS Models, University of Pittsburgh, Pittsburgh, Penn., November 15-17, 1973.



Benbasat Izak, Cognitive Style Considerations in DSS Design

Bello, F., "The Information Theory." Fortune, pp. 136-140, Dec. 1953.

Benjamin B., and Maitland, J., "Operational Research and Advertising: Some Experiments in the Use of Analogies," Oper. Res. Quart. 9, pp. 207-217, 1958.

Bennis, W. G., "Commentary of 'The Researcher and the Manager: A Dialectic Implementation.'" Management Science, Vol. 12, No. 2, pp. B13-16, Oct. 1965.

Bennett, J. L., Expanded Roles for Information Transfer Specialists in Interactive Information Management, IBM Research Report RJ-2025.

Bennett, J. L., "Integrating Users and Decision Support Systems." In J. D. White (ed.), Proceedings of the Sixth and Seventh Annual Conferences of The Society for Management Information Systems, pp. 77-87. Ann Arbor: University of Michigan, July 1976.

Bennett, J. L., "The User Interface in Interactive Systems", pp. 159-196 in Annual Review of Information Science and Technology, Vol. 7, Carlos Cuadra, ed., 1973.

Bennett, J. L., User-Oriented Graphics Systems for Decision Support in Unstructured Tasks, IBM Research Report RJ-1940.

Berger, Joseph, et al., Types of Formalization in Small-Group Research, Houghton Mifflin, Boston, 1962.

Berry P., "The Democratization of Computing." Paper presented at Eleventh Symposium Nacional de Sistemas Computacionales, Monterrey, Mexico, March 15-18, 1977.

Bieri, J., "Cognitive Structures in Personality," in Personality Theory and Information Processing, H. Schroder and P. Suedfeld, eds., The Ronald Press, New York, pp. 178-208, 1971.

Blankenship, L., Vaughn, "Public Administration and the Challenge to Reason," in Public Administration in a Time of Turbulence, Dwight Waldo, ed.

Blasis, J-P De, and T. H. Johnson, "Data Base Administration-Classical Pattern, Some Experiences and Trends." American Federation of Information Processing Societies Conference Proceedings, 1977 National Computer Conference, Vol. 46, pp. 1-7, 1977.

Blau, P. M., The Dynamics of Bureaucracy, University of Chicago Press, Chicago, 1955.

Blount, Thomas, "Design of a Man-Machine System for a Production Scheduling Problem", unpublished Masters Thesis, Sloan School of Management, MIT, 1973.

Blumenthal, D. Jeffrey, "Simulation Models in Consumer Products Budgeting". Paper presented at ORSA/TIMS Conference, April, 1974.

Boies, S. J., "User Behavior in an Interactive Computer System", IBM Systems Journal, Vol. 13, #1, pp. 2-19.

Boone, Louis and David Kurtz , "Marketing Information Systems, Current Status in American Industry", Combined Proceedings: 1971 Spring and Fall Conferences, American Marketing Association, pp. 163-167 , 1971.

Boshell, E. O., "Operations Research, Top Management Tool, " Dun's Review and Modern Industry 63, No. 3, 49-51 , 1957.

Botkin, J. W., "An Intuitive Computer System: A Cognitive Approach to the Management Learning Process." Ph.D. Dissertation, Harvard Graduate School of Business Administration, 1973.

Boulden, James and Buffa, Elwood, "Corporate Models: On-Line, Real time systems", Harvard Business Review, July-Aug. 1970, pp. 76-83, 1970.

Bowman, E. H., "Consistency and Optimality in Managerial Decision Making." Management Science, Vol. 9, No. 2, pp. 310-321, Jan. 1963.

Boyd, D., " A Methodology for Analyzing Decision Problems Involving Complex Preference Assessments," Ph.D. Dissertation, Stanford University, 1970.

Braybrooke, David, "The Mystery of Executive Success Re-examined," Administrative Science Quarterly, Vol 8 , pp. 533-560, 1964.

Braybrooke, David, and Lindblom, Charles E., A Strategy of Decision, Free Press, New York, 1963.

Brien, R. H. , "Marketing Information Systems: The State of the Art" Conference Proceedings of the American Marketing Assoc. pp. 19-27 , 1972.

Briggs-Myer, I. The Myers-Briggs Type Indicator. Palo Alto, Calif.: Consulting Psychologists Press, 1962.

Bronowski, J., "The Creative Process," Scientific American, Vol. 199 , pp. 59-65, 1958.

Brooks, F. P., The Mythical Man-Month. Reading, Mass.: Addison-Wesley, 1975.

Brown, A. A., Hulswit, F. T. and Kittelle, J. D., "A Study of Sales Operations," Operations Research, pp. 296-308, 1956.

Bueneman, O. Peter, Morgan, Howard L. and Zisman, Michael D., Display Facilities for DSS: The Daisy Approach, Data Base, Vol. 8, No. 3, 1977.

Burach, E. J., "Operations Research: Its Future Place in Business Organization." Michigan State University, Business Topics , Vol. 17, No. 4, pp. 9-16, 1969.

Burch, J. G. and Strater, F. R. , Information Systems: Theory and Practice, John Wiley and Sons, New York, 1974.

Burns, Tom, "The Directions of Activity and Communications in a Departmental Executive Group, " Human Relations, Vol.7, pp. 73-97, 1957.

Burns, Tom, Management in Action, Operational Research Quarterly, Vol. 8, pp. 45-60, 1957.

- Business Week, "Corporate War Rooms Plug into the Computer", Aug. 23, pp. 65-66, 1976.
- Caminer John J. and Andlinger, Gerhard R., "Operations Research Roundup," Harvard Business Review 32, No. 6, 132-136, 1954.
- Canning, R. G. (ed.). APL and Decision Support Systems. EDP Analyzer 14, 5, pp. 1-12, 1976.
- Carbonell, James (1969): "On Man-Computer Interaction: A Model and Some Related Issues", IEEE Trans. on Systems Science and Cybernetics, Jan. pp. 16-20, 1969.
- Carlisle, J., "Cognitive Factors in Interactive Decision Systems." Ph.D. Dissertation, Yale University, 1974.
- Carlisle, J., "Interaction Between Conceptual Complexity and Environmental Complexity in Man Computer Interactive Problem Solving", Unpublished Ph.D. Dissertation, Yale University, 1974.
- Carlson, E. D., and Sutton, J. A., A Case Study of Non-Programmer Interactive Problem-Solving. San Jose, Calif.: IBM Research Report RJ-1382, 1974.
- Carlson, E. D., "An Approach for Designing Decision Support Systems, IBM Research Report RJ-1959.
- Carlson, E. D., "An Overview of Productivity Aids for Developing Interactive Business Applications," Proceedings of the National Conference on Information Systems Development, SMIS, Tucson, 1978.
- Carlson, E. D., Grace, B. F. and Sutton, J. A., "Case Studies of End User Requirements for Interactive Problem-Solving," Management Information Systems Quarterly, Volume 1, Number 1, pp. 51-63, 1977.
- Carlson, E. D., Decision Support Systems: Personal Computing Services for Managers
- Carlson, E. D., et al. "The Design and Evaluation of an Interactive Geodata Analysis and Display System." Paper presented at the International Federation for Information Processing Congress, Stockholm, Sweden, August 1974.
- Carlson, E. D., "Evaluating the Impact of Information Systems," Management Datamatics, Vol. 3, No. 2, pp. 57-67, 1974.
- Carlson, E. D., Giddings, G. M. and Williams, R., Multiple Colors and Image Mixing in Graphics Terminals (In Information Processing 77, edited by B. Gilchrist. IFIP North-Holland Publishing Co., 1977, pp. 179-182, 1977.
- Carlson, E. D., ed., "Proceedings of a Conference on Decision Support Systems," Data Base, Vol. 8, No. 3, Einter 1977.

Carlson, E. D., Using large data bases for interactive problem solving. Proceedings of the International Conference on Very Large Data Bases 1, 1. ACM, New York. pp. 499-501, 1976.

Carlson, Sune, Executive Behaviour, Strombergs, Stockholm, 1951.

Carroll, Donald, "Implications if On-Line Real Time Systems for Managerial Decision Making" in Charles Myers, ed., The Impact of Computers on Mangement. Cambridge, Mass: MIT Press, 1967.

Carroll, Donald, "Man-Machine Cooperation on Planning and Control Problems" Sloan School of management, MIT, Working Paper #145-65, 1965.

Carroll, Donald C., "On the Structure of Operational Control Systems," Operations Research and the Design of Management Information Systems, John F. Pierce, Jr. (Ed.), Special Tech, Association Publication Stap. No. 4, Chapter 23, pp. 398-402, 1965.

Carter, N., "The Executive and the Terminal." In J. D. White (ed.), Proceedings, Sixth and Seventh Annual Conferences of the Society for Management Information Systems, pp. 87-89. Ann Arbor: University of Michigan, Management Information Systems Research Center, July 1976.

Cartwright, D., "Achieving Change in People: Some Applications of Group Dynamics Theory." Human Relations, Vol. 14, No. 4, pp. 381-392, 1951.

Cartwright, D. nad Zander, Alvin, Group Dynamics, Research and Theory, New York: Harper and Row, 1960.

Cervin, V. B. and Henderson, G. P., "Statistical Theory of Persuasion," Psychological Review, Vol. 68, No. 3, pp. 157-166, 1961.

Chen, P. P-S., "The Entity-Relationship Model - A Basis for the Enterprise View of Data." American Federation of Information Processing Societies Conference Proceedings, 1977 National Computer Conference, Vol. 46, pp. 77-84, 1977.

Chambers, John, "Total vs. Modular Information Systems: Empirical Experience in Finance and Personnel", pp. 47-64 in Smith, Robert ed., Management Information Systems in the 1970s, Center for Business and Economic Research, Kent State University, 1970.

Chang, C. L., Deduce --- A Deductive Query Language for Relational Data Bases (In Pattern Recognition and Artificial Intelligence edited by C. H. Chen, Academic Press, pp. 108-134, 1976.

Charnes, A. Cooper, W. W. DeVoe, J. K. Learner, D. B. and Reinecke, W., "LP II: A Goal Programming Model for Media Planning," Management Sciences Research Report No.96, Graduate School of Industrial Administration, Carnegie Institute of Technology, Pittsburgh, January 1967.

Charnes, A. and Cooper, W. W., "Management Sciences and Management-Some Requirements for Further Development," Management Science, Vol. 13, No. 2, October 1966.

Cherry, C., On Human Communication. New York: Wiley, 1957.

Chervany, N. and Dickson, G., "An Experimental Evaluation of Information Overload in a Production Environment, Management Science, Vol. 20, No. 10, pp. 1335-44, 1974.

Chomsky, N. Problems of Knowledge and Freedom. New York: Pantheon, 1971.

Churchill, N. C., Kemster, J. H. and Uretsky, M., Computerbased Information Systems for Management: A Survey. National Association of Accountants, 1969.

Churchman, C. West, "Case Histories Five Years After-A Symposium," Opns. Res. 8, pp. 254-259, 1960.

Churchman, C. West, Challenge to Reason. New York: McGraw-Hill, 1968.

Churchman, C. West, "Lockean Inquiring Systems," Internal Working Paper No. 45, Space Sciences Laboratory, Social Sciences Laboratory, Social Sciences Project, University of California, Berkeley, 1966.

Churchman, C. West, Design and Inquiry," Internal Working Paper No. 28, Space Sciences Laboratory, Social Sciences Laboratory, Social Sciences Project, University of California, Berkeley, 1965.

Churchman, C. West, "Hegelian Inquiring Systems," Internal Working paper No. 49, Space Sciences Laboratory, Social Sciences Project, University of California, Berkeley, 1966.

Churchman, C. West, "Kantian Inquiring Systems," Internal Working Paper No. 46, Space Sciences Laboratory, Social Sciences Project, University of California, Berkeley, 1966.

Churchman, C. West, "Managerial Acceptance of Scientific Recommendations." California Management Review, Vol. 7, No. 1, pp. 31-38, Fall 1964.

Churchamn, C. West, "On Large Models of Systems," Internal Working Paper No. 30, Space Sciences Laboratory, University of California, Berkeley, June, 1966.

Churchamn, C. West, and Schainblatt, A. M., "On Mutual Understanding," Management Science, Vol. 12, No. 2, pp. B-40-B-42, 1965.

Churchman, C. West, "OR as a Profession," Management Science 17, B37-B53, 1970.

Churchman, C. West, Prediction and Optimal Decision: Philosophical Issues of a Science of Values, Prentice-Hall, New Jersey, 1961.

Churchman, C. West, "Rationalist Inquiring Systems," Internal Working Paper No. 20, Space Sciences Laboratory, Social Sciences Project University of California, Berkeley, 1965.

Churchman, C. West, and Ratoosh, P., "Report on Further Implementation Experiments," Center for Research in Management Science, University of California, Berkeley, Working Paper No. 26, March 1961.

Churchman, C. West, and Schainblatt, A. H., "The Researcher and the Manager: A Dialectic of Implementation," Management Science, Vol. 11, No. 4, pp. B69-87, 1965.

Churchman, C. West, "Singerian Inquiring Systems," Internal Working Paper No. 122, Space Sciences Laboratory, Social Sciences Project, University of California, Berkeley, 1970.

Churchman, C. West, The Design of Inquiring Systems. New York: Basic Books, 1971.

Churchman, C. West, "The Philosophy of Experimentation," Statistics and Mathematics in Biology, Kempthorne, et al., eds., Iowa State College Press, 1954.

Churchman, C. West, and Schainblatt, A. J., "The Researcher and the Manager: A Dialectic of Implementation," Management Sci. 11, B69-B78, 1965.

Churchman, C. West, The Systems Approach. New York: Dell, 1968.

Churchman, C. West, "The Use of Research in the Preparation of Decision", Studien-gruppe für Systemforschung, Bericht No. 37, Symposium Forschung, Stadt und Gesellschaft, 1966.

Churchman, C. West, Theory of Experimental Inference, MacMillan, New York, 1948.

Clarkson, G. P. E., Portfolio Selection: A Simulation of Trust Investment Englewood Cliffs, NJ: Prentice-Hall, 1962.

Claycamp, J., and Amstutz, A. E., "Simulation Techniques in the Analysis of Marketing Strategy." In F. M. Bass et al. (eds.), Applications of the Sciences in Marketing Management, pp. 113-150. New York: Wiley, 1968.

Cochrane, J. L., and Zeleny M., (eds.). Multicriteria Decision Making. Columbia S.C.: University of South Carolina Press, 1973.

Codd, E. F. "A Relational Model of Data for Large Shared Data Banks." Communications of the Association for Computing Machinery, Vol. 13, No.6, pp. 377-387, June 1970.

Codd, E. F., "Relational Completeness of Data Base Sublanguages." In R. Rustin, Data Base Systems, pp. 65-98. Englewood Cliffs, NJ: Prentice-Hall, 1972.

Colby, K. M., Watt, J. B. and Gilbert, J. P., "A Computer Method of Psychotherapy: Preliminary Communication." Journal of Nervous and Mental Diseases, Vol. 142, No. 2, pp. 148-152, 1966.

Coleman, M. K., Hinkelman, K. W. and Kolechta, W. J. , (1971): "Alcoa Picturephone Remote Information System:", Fall Joint Computer Conference, pp. 65-70, 1971.

Cook, E. V., "Discussion of Implementation and its Assessment for OR Projects, Together with Four Implementation Case Histories," Imperial College of Science and Technology, Univ. of London, London, September 1969.

Cooper, D. O., Davidson, L. B. and Denison, W. K., "A Tool for Effective Financial Analysis", Interfaces, Vol. 5, #2, Part 2, pp. 91-103, 1975.

Cotton, I. W., "Microeconomics and the Market for Computer Services." Computing Surveys, Vol, 7, No. 2, pp. 95-111, June 1975.

Corbato, F. J., "Sensitive Issues in the Design of Multi-Use Systems", Project MAC Memo #383, MIT, Cambridge, Mass, 1968.

Couger, J. D., et al. "Curriculum Recommendations for Undergraduate Programs in Information Systems." Communications of the Association for Computing Machinery, Vol. 16, No. 12, pp. 727-749, Dec. 1973.

Crane, Roger R., "Building an OR Team Within Your Own Company, " Chemistry in Canada 8, 38-47, 1956.

Cristiani, E. J. , et al, An Interactive System for Aiding Evaluation of Local Government Policies, IEEE Transactions on Systems, Man, and Cybernetics, Vol. SMC-3, No.2, pp. 141-146, 1973.

Cyert, R. M., and March J. G., A Behavioral Theory of the Firm. Englewood Cliffs, NJ: Printice-Hall, 1963.

Cyert, R. M., Simon, H. A., and Trow, D. B., "Observation of a Business Decision." Journal of Business, Vol. 29, No. 4, pp. 237-248, Oct. 1956.

Dalton, M., Men Who Manage, John Wiley, New York, 1958.

Dantzig, G. B., Operations Research in the World of Today and Tomorrow. Berkeley: Institute of Engineering Research, University of California at Berkeley, Report ORC 65-7, 1965.

Davis, G. B., Management Information Systems: Conceptual Foundations, Structure, and Development. New York: McGraw-Hill, 1973.

Davis, Randall , "A DSS for Diagnosis and Therapy", Data Base, Vol 8, No. 3, 1977.

Dearborn, D. C., and Simon, H. A., "The Identification of Executives." In H. A Simon, Administrative Behavior (3rd ed.), pp. 309-314. New York: Free Press, 1976.

Dearden, J., "Can Management Information Be Automated," Harvard Business Review, Vol. 42, pp. 128-135, 1964.

- Dearden, J., "MIS Is a Mirage." Harvard Business Review, Vol. 50, No. 1, pp. 90-99, 1972.
- Dearden, J., "Myth of Real-Time Management Information." Harvard Business Review, Vol. 44, No. 3, pp. 123-132, 1966
- Defilipp, Stan, "An Overview of the Concept 2nd Evaluation of Decision Support Systems", Special Problem presented to Dr. L. G. Callanhan, Ga. Inst. of Technology, Atlanta, Georgia, 1978.
- Demski, J. S. Information Analysis. Reading, Mass.: Addison-Wesley, 1972.
- Denny, G. J., An Introduction To SQL, A Structured Query Language IBM Research Report RA-93.
- Derthick, Martha, New Towns In-Towns, Why a Federal Program Failed. Washington, D. C.: The Urban Institute, 1972.
- Dickson, Gary and Richard Powers, "MIS Project Management: Myths, Opinions, and Reality". California Management Review, Spring, 1973.
- Dickson, G. W. and Simmons, John K., "The Behavioral Side of MIS," Business Horizons , pp. 59-71, 1970.
- Dial, O. E. et al, Municipal Information Systems: The State of the Art in 1970, PB 297-347, National Technical Information Service, Springfield, Va., 1971.
- Diebold, J., "Bad Decisions on Computer Use." Harvard Business Review, Vol. 47, No. 1, pp. 14-28, 1969.
- Dmytryshak, C., "The Investment Analysis Language", pp. 525-536 in AFIPS Proceedings, Fall Joint Computer Conference 1972, Vol. 41, Part 1. Montvale, NJ: AFIPS Press, 1972.
- Doktor, R. H., "Cognitive Characteristics in the Design of Implementation Facilitation Subsystems." Paper presented at the Implementation II Conference, University of Pittsburgh, Pittsburgh, Penn., February 18-20, 1976.
- Doktor, R. H. and Hamilton, W. F., "Cognitive Style and the Acceptance of Management Science Recommendations." Management Science, Vol. 19, No. 8, pp. 994-894. April 1973.
- Doktor, R. H. , "Development and Mapping of Certain Cognitive Styles of Problem-Solving." Ph.D. Dissertation, Stanford University, 1969.
- Donovan, J. J., et al. "An Application of a Generalized Management Information System to Energy Policy and Decision Making-The User's View." American Federation of Information Processing Societies Conference Proceedings, 1975 National Computer Conference, pp. 681-686, May 1975.
- Donovan, J. J., Database System Approach to Management Decision Support. Cambridge, Mass.: Center for Information Systems Research, M.I.R., Report CISR-25, 1976.



Donovan, J. J., and Madnick, S. E., "Hierarchical Approach to Computer System Integrity," IBM Systems Journal, Vol. 14, no. 2, pp. 188-202, 1975.

Donovan, J. J. and Madnick, S. E., Institutional and Ad hoc Decision Support Systems and Their Effective Use. Cambridge, Mass.: Center for Information Systems Research, M.E. T., Report CISR-27, Nov. 1976.

Donovan, J. J. and Madnick, S. E., "Virtual Machine Advantages in Security, Integrity, and Decision Support Systems." IBM Systems Journal, Vol. 15, No. 3, pp. 270-278, 1976.

Drake, John, The Administration of Transportation Modeling Projects, Lexington, Mass.: D. C. Heath and Company, 1973.

Drucker, Peter F., "Management Science and the Manager," Management Sci, 1, 115-126, 1955.

Drucker, Peter F., The Practice of Management, Harper and Row, New York, 1954.

Dunlop, Robert "Some Empirical Observations on the Man-Machine Interface Question", pp. 219-239 in Kriebel, Charles, Richard Van Horn, and J Timothy Heames, eds., Management Information Systems: Progress and Perspectives. Pittsburgh: Carnegie Press, Carnegie-Mellon University, 1971.

Dutton, J. M., and Starbuck, W. H. Computer Simulation of Human Behavior. New York: Wiley, 1971.

Dyer, J. S. "A Time-Sharing Computer Program for the Solution of the Multiple Criteria Problem," Management Science, Vol. 19, No. 12, pp. 1379-1383, 1973.

Dyer, J. S. "An Empirical Investigation of a Man-Machine interactive Approach to the Solution of a Multiple Criteria Problem." In J. L. Cochrane and M. Zeleny (eds.), Multicriteria Decision Making, pp. 202-216. Columbia, S. C.: University of South Carolina Press, 1973.

Dyer, J. S. and Feinberg, A., "An Interactive Approach for Multicriterion Optimization, with an Application to the Operation of an Academic Department," Management Science, Vol. 19, No. 4, pp. 357-368, 1972.

Eason, K. D. Understanding the Naive computer user. The Computer Journal 19, 1, 3-7, 1976.

Edelman, F. "Art and Science of Competitive Bidding." Harvard Business Review, Vol. 43, No. 4, pp. 53-66, July-August, 1965.

Edelman, Franz, "They Went Thataway," Interfaces, Vol. 7, No. 3, pp. 39-43, 1977.

EDP Analyzer. "APL and Decision Support Systems." EDP Analyzer, Vol. 14, No. 5, May 1976.

Efraim Turban, "A Sample Survey of Operations-Research Activites at the Corporate Level," Opns. Res. 20, 1962.

- Eilon, S. "Goals and Constraints in Decision Making." *Operational Research Quarterly*, Vol. 23, No. 1, pp. 3-15, March 1972.
- Eilon, Samuel, "What Is a Decision?," *Management Science*, Vol. 16, No. 4, pp. B-172-B-189, 1969.
- Emery, J. C., *An Overview of Management Information Systems. Data Base* 2-4, 1-11, 1972.
- Emery, J. C., "The Economics of Information." *Wharton Quarterly*, Vol. 2 No. 1, pp. 2-7, Fall 1967.
- Emshoff, J. R., and Sisson, R. L., *Design and Use of Computer Simulation Models*. New York: Macmillan, 1970.
- Enrick, Norbert L., *Management Operations Research*, Holt, Rinehart, and Winston, New York, 1965.
- Erdstrom, Olof, *Man Computer Decision Making; the Development of three Terminal Systems for Empirical Research*. Gothenberg, Sweden, BAS, Forlag, 1972.
- Erikson, E. *Young Man Luther*. New York: Norton, 1958.
- Evan, William, and Guy Black, "Innovation in Business Organizations: Some Factors Associated with Success or Failure of Staff Proposals" *Journal of Business*, Vol. 40, pp. 519-530, 1967.
- Farley J. U. and Ring, L. W., "An Empirical Test of the Howard-Sheth Model of Buyer Behavior." *J. Marketing Res.* 7, 427-438, 1970.
- Feigenbaum, E. A., and Feldman J., (eds.). *Computers and Thought*. New York: McGraw-Hill, 1963.
- Feinberg, A., "An Experimental Investigation of an Interactive Approach for Multicriterion Optimization, with an Application to Academic Resource Allocation," Ph.D. Dissertation University of California, Los Angeles, 1972.
- Feyerabend, P. K., "How to Be a Good Empiricist-A Plea for Tolerance in Matters Epistemological," in *The Philosophy of Science*, P. H. Nidditch, ed., Oxford, 1968.
- Fine, R. *The Psychology of the Chess Player*. New York: Dover, 1967.
- Finet, J. M. L. and Johnson, P. L., "The Calibration of Nonlinear Models," S. M. Thesis, M. I. T., Cambridge, MA, June 1974.
- Fishburn, P. C., *Decision and Value Theory*, Wiley, New York, 1964.
- Fishburn, P. C., "Methods of Estimating Additive Utilities," *Management Science*, Vol. 13, No. 7, pp. 435-453, 1967.
- Fisher, Robert and Hirst Melvyn "Model Building in Marketing" *Management Decision*, Vol. 12, #1, pp. 4-11, 1973.

- Friedman, L. R., "Measuring the Effectiveness of Consumer Advertising," Marketing Science Institute Report, Cambridge, Mass., 1971.
- Friedman, Neil, The Social Nature of Psychological Research: The Psychological Experiment as a Social Interaction, Basic Books, New York, 1967.
- Forrester, J. W., Urban Dynamics. Cambridge, Mass.: M. I. T., 1969.
- Gardner, J., "America in the Twenty-Third Century," New York Times, July, 27, 1968.
- Garrity, John, "Top Management and Computer Profits", Harvard Business Review, Vol 41, #4, pp. 6 -12, 1963.
- Geoffrion, A. M., Dyer, J. S. and Feinberg, A., "An Interactive Approach for Multicriterion Optimization with an Application to the Operation of an Academic Department," Management Science, Vol. 19, No. 4, pp. 357-368, 1972.
- Gerrity, T. P. Jr., Design of Man-Machine Decision Systems: An Application to Portfolio Management. Sloan Management Review 14, 59-75, 1971.
- Gerrity, T. P., Jr. "The Design of Man-Machine Decision Systems." Ph.D. Dissertation, M.I. T., 1970.
- Gerrity, T. P., Jr. "The Design of Man-Machine Decision Systems: An Application to Portfolio Management." Sloan Management Review, Vol. 12, No. 2, pp. 59-75, Winter 1971.
- Gershefski, G. Q. "Building a Corporate Financial Model." Harvard Business Review, Vol. 47, No. 4, pp. 61-72, July-August 1969.
- Gershefski, G. Q. "Corporate Models-The State of the Art." Management Science, Vol. 16, No.6, pp. B303-321, Feb. 1970.
- Gershefski, G. Q., "Corporate Models-The State of the Art." Management Science, Vol. 16, #6, pp, B303-B312, 1970.
- Gerson, E. M. "Rationalization and Varieties of Technical Work." Unpublished paper. San Francisco: Pragmatica Systems, Inc., 1977.
- Gibson, C. F. "A Methodology for Implementation Research." In R. L. Schultz and Slevin D. P., (eds.), Implementing Operations Research/Management Science, part II, pp. 53-73. New York: American Elsevier, 1975.
- Gibson, C. F., "A Contingency Theory of Implementation: Implications for Research and Practice." Paper presented at the Implementation II Conference, University of Pittsburgh, Pittsburgh, Penn., February 18-20, 1976.

Gibson, C. F., and Hammond, J. S. , "Contrasting Approaches for Facilitating the Implementation of Management Science." Paper presented at the Operations Research Society of America/The Institute of Management Sciences Joint National Meeting, Boston, April 22, 24, 1974.

Gidding, G. M. and Carlson, E. D., An Interactive System for Creating, Editing and Displaying a Geographic Base File. IBM Research Report, RJ 1288, IBM Research Laboratory, San Jose, California, 1973.

Ginzberg, M. J. "A Process Approach to Management Science Implementation." Ph.D. Dissertation, M.I.T., 1975.

Ginzberg, M. J., "A Detailed Look at Implementation Research", Center for Information System Research, MIT, Report #4 (also issued as Sloan School of Management, MIT, Working Paper #753-74) , 1974.

Godin, V. B., "Interactive Scheduling: Historical Survey and State of the Art," AIIE Transactions, Vol. 10, No. 3, 1978.

Goffman, Erving , Frame Analysis: An Essay on the Organization of Experience, New York: Harper and Row , 1974.

Goldie, J. Harry, "Simulation and Irritation", pp. 1-28 of an Addendum to Schreiber, 1970.

Gordon, L. A. Miller D, and Mintzberg, H. Normative Models in Managerial Decision Making. National Association of Accountants, New York, 1975.

Gore, E. J. Administrative Decision Making. New York: Wiley, 1964.

Gorry, G. A. , and Morton, M. S. Scott, "A Framework for Management Information Systems." Sloan Management Review, Vol. 13, No. 1, pp 55-70, Fall 1971.

Gorry, G. A., "The Development of Managerial Models," Sloan Management Review, Vol. 12, pp. 1-16, 1971.

Grace, Barbara F., Training Users of a Prototype DSS.

Grace, Barbara F., A Case Study of Man/Computer Problem Solving: Observations on Interactive Formulation of School Attendance Boundaries, IBM Research Report RJ 1483, IBM Research Division, San Josem California, February 1975.

Grace Barbara F., Training users of a decision support system. IBM Research Report RJ 1970. IBM Research Division, San Jose, CA, May 1976.

Grayson, C. J. "Management Science and Business Practice." Harvard Business Review, Vol. 51, No. 4, pp. 41-48, July, 1973.

Gregory, Robert and Richard Van Horn , Automatic Data Processing Systems, second edition, Belmont, California: Wadsworth, 1963.

Grindlay, Andrew, and Gordon Cummer , "Comment: Computer Based Decision Systems and Canadian Management", Management Science, Vol. 20, #4, pp. 572-574 , 1973.

Grochow, Jerrold , Cognitive Style as a Factor in the Use of Interactive Computer Systems for Decision Support, Unpublished Ph.D. Dissertation, MIT, 1974.

Hackathorn, Richard D., "Modeling Unstructured Decision Making", Data Base, Vol 8, No. 3, 1977.

Hagstrom, Warren O., The Scientific Community, Basic Books, New York, 1965.

Hahn, Walter A., Jr., "Applied Business Research," IRE Trans. on Eng. Management EM-9, 3-10, 1962.

Halbrecht, H. Z. "Through a Glass Darkly." Interfaces, Vol w, No. 4, pp. 1-22, 1972.

Halbrecht, H.Z., "Great Ferrets Are Hard to Find (How to Hire the Compleat OR/MS Professional)." Paper presented at a Conference on the Implementation of Computer-based Decision Aids, Cambridge, Mass., Center for Information Systems Research, M.I.T., April 3-5, 1975.

Hall, W. K. "Strategic Planning Models: Are Top Managers Really Finding Them Useful?" Journal of Business Policy, Vol. 3, No. 2, pp. 33-42, 1973.

Hamilton, William, and Michael Moses , "A Computer Based Corporate Planning System", Management Science, Vol. 21, #2, pp. 148-159, 1974.

Hammond, J. S, III., Bud Mathaisal. Boston: Intercollegiate Case Clearing House, No. 9371251, 1971.

Hammond, J. S., III., "The Roles of the Manager and Management Scientist in Successful Implementation." Sloan Management Review, Vol. 15, No. 2, pp. 1-24, Winter 1974.

Hammond, J. S.III., "Do's and Dont's of Computer Models for Planning", Harvard Business Review, pp. 110-123, 1974.

Harvey, Allan , "Factors Making for Implemenations Success and Failure", Management Science, Vol. 16, #6, pp. 92-104, 1970.

Harvey, Allan, "Factors Making for Implementation Success and Failure," Management Science, Vol. 16, No. 6 , pp. B312-B321, 1960.

Hax, Arnoldo , "Integration of Strategic and Tactical Planning in the Aluminum Industry", MIT, Operations Research Center Working Paper #026-73 , 1973.

Hayes, Robert and Richard Nolan , "What Kind of Corporate Modeling Functions best?" Harvard Business Review, May-June 1974, pp. 102-112, 1974.

Heany, D. F., "Is TIMS Talking to Itself?" Management Science, Vol. 12, No. 4, pp. B146-155, Dec. 1965.

Heany, D. F., "Education - The Critical Link in Getting Managers to Use Management Systems." Interfaces, Vol. 2, No. 3, pp. 1-7, May 1972.

Hedburg, B. On Man-Computer Interaction in Organizational Decision Making, A Behavioral Approach, Gothenberg, Sweden, BAS, ek., Forlag, 1970.

Heiman, David R., "A Procedure for Predicting the Potential Success or Failure of an OR/MS Activity," unpublished Master's Thesis, Northwestern University, May 1964.

Helmer, Olaf and Rescher, Nicholas, "On the Epistemology of the Inexact Sciences," Management Science, Vol. 6, pp. 25-52, 1959.

Herman, C. C. and Magee, J. F., "Operations Research for Management," Harvard Business Review, Vol. 31, No. 4, 1953.

Hertz, D. B. "Progress of Industrial Operations Research in the US," Proc. First Internat. Conf. on OR, ORSA, Baltimore, Md., 1957.

Hertz, D. B. "Mobilizing Management-Science Resources," Management Sci. 11, 361-367, 1965.

Hertzberg, F. The Motivation to Work. New York: Wiley, 1959.

Hetrick, J. C. "Operations Research: A Progress Report," Chem. Eng., 137-143, January 23, 1961.

Hirschman, A. O., and Lindblom, C. E., "Economic Development, Research and Development, Policy Making: Some Converging Views." Behavioral Science, Vol. 7, No. 2, pp. 211-222, April 1962.

Hitch, Charles, J., "Comments on 'Fallacies in OR,'" Opns. Res. 4, 426-430, 1956.

Hitt, William D., "Two Models of Man," American Psychologist, Vol. 24, No. 7, pp. 651-658, 1969.

Holloway, C. A., and Mantey, P. E., Implementation of an Interactive Graphics Model for Design of School Boundaries. Stanford, Calif.: Stanford University Graduate School of Business, Research Paper 299, 1976.

Holloway, C. A., and Mantey, P. E., et al. "An Interactive Procedure for the School Boundary Problem with Declining Enrollments." Operations Research, Vol. 23, No. 2, pp. 191-206, March-April 1975.

Homans, George C., The Human Group, Harcourt, Brace, New York, 1950.

Hoos, I. R. Systems Analysis in Public Policy. Berkeley: University of California, Press 1972.

Horman, Aiko , Planning by Man-Machine Synergism," pp. 69-134 in Sackman and Citrenbaum , 1972.

Horne, J. H. and Lupton, Tom, "The Work Activities of Middle Managers -- An Exploratory Study," The Journal of Management Studies, Vol. 2, pp. 14-33, 1965.

Hovey, R. W. and Wagner, H. M., "A Sample Survey of Industrial Operations - Research Activities," Opns. Res. 6, 878-881 , 1958.

Howard, R. A., "The Foundations of Decision Analysis," I. E. E. E. Trans. on Systems Science and Cybernetics, Vol. SSC-4, No. 3 (September 1958), pp. 211-219 ,1958

Howard R. A., Matheson, J. E., and North, D. W., "The Decision to Seed Hurricanes." Science, Vol. 176, No. 4040, pp. 1191-1202, 1972.

Hudson, Liam, Ed., The Ecology of Human Intelligence, Penguin, England, 1970.

Hudson, Liam, Frames of Mind, W. W. Norton, New York, 1968.

Hunt, J. G., and Newell, P. F. "Management in the 1980's Revisited." Personnel Journal, Vol. 50, No. 1, pp. 35-43, Jan. 1971.

Huysmans, J. H. B. M. , "The Implementation of Operations Research: A Study of Some Aspects Through Man-Machine Simulation," Unpublished Doctoral Dissertation, U. C., Berkeley, 1968. Internal Working Paper #78. Space Sciences Laboratory, U. S. , Berkeley , 1968.

Huysmans, J. H. B. M., "TheEffectiveness of the Cognitive Style Constraint in Implementing Operations Research Proposals." Management Science, Vol. 17, No. 1, pp. 92-104, Sept. 1970.

Huysmans, J. H. B. M., The Implementation of Operations Research: An Approach to the Joint Consideration of Social and Technological Aspects. New York: Wiley, 1970.

Huysmans, J. H. B. M., "Operations Research Implementation and the Practice of Management." Paper presented at the Research Conference on the Implementation of OR/MS Models, University of Pittsburgh, Pittsburgh, Penn., November 15-17, 1973.

Johnson, C. J. , "Principles of Interactive Systems", IBM Systems Journal, Vol. 7, #3, pp. 147-174 , 1968.

Jolson, M. A. and Rossow, G. L., "The Delphi Process in Marketing Decision Making," J. Marketing Res. 8, 443-448 , Nov. 1971.

Jung, C. G., "Psychological Types," The Basic Writings of C. G. Jung, Modern Library Edition, New York, pp. 183-285.

- Jung, C. G., *Psychological Types*, Rutledge, London, 1923.
- Jung C. G., *The Structure and Dynamics of the Psyche*, Pantheon. New York, 1960.
- Joyce, John D., and Oliver, N. N., Impacts of a Relational Information System on Industrial Decisions, *Data Base*, Vol. 8, No. 3, 1977.
- Kami, Michael J., "Planning: Realities and Theory," *Managing Change*, A Collection of papers presented at the National Industrial Conference Board, Inc., Management Conference in New York City, January 19 and 20, 1967.
- Kanter, J. *Management-oriented Management Information Systems*, 2nd ed. Englewood Cliffs, N. J. : Prentice-Hall, 1977.
- Katz, D., and Kahn, R. L. "Organizations and the System Concept." In D. Katz and R. L. Kahn, *The Social Psychology of Organizations*, chap. 2. New York: Wiley, 1966.
- Keen, P. G. W., "A Clinical Approach to Implementation." Cambridge, Mass.: Sloan School of Management, M. I. T., Working Paper 730-75, 1975.
- Keen, P. G. W., "Decision Support Systems: An Overview." Paper presented at the Sixth Annual Conference of the Society for Management Information Systems Conference, San Francisco, September 11 -13, 1974.
- Keen, P. G. W., "Computer-Based Decision Aids: The Evaluation Problem." *Sloan Management Review*, Vol. 16, No 3, pp. 17-29, Spring 1975.
- Keen, P. G. W., "Computer Systems for Top Managers: A Modest Proposal." *Sloan Management Review*, Vol. 18, No. 1, pp. 1-17, Fall 1976.
- Keen, P. G. W., "The Evolving Concept of Optimality." In M. K. Starr and M. Zeleny (eds.), *Multi-Criteria Decision Making*, pp. 31-57. The Institute of Management Sciences (TIMS) Studies in the Management Sciences, Vol. 6, 1977.
- Keen, P. G. W., (ed.). *The Implementation of Computer-Based Decision Aids*. Cambridge, Mass.: Proceedings of a Conference Sponsored by the Center for Information Systems Research, M. I. T., April 3-5, 1975.
- Keen, P. G. W., *Implementation Research in MIS and OR/MS: Description versus Prescription*. Stanford, Calif.: Stanford Business School Research Paper No. 390, 1977.
- Keen, P. G. W., "The Intelligence Cycle: A Differentiated Perspective on Information Processing." *American Federation of Information Processing Societies Proceedings*, 1977 National Computer Conference, Vol. 46, pp. 317-320, 1977.
- Keen, P. G. W., "Managing Organizational Change: The Role of MIS." In J. D. White (ed.), *Proceedings of the Sixth and Seventh Annual Conferences of the Society for Management Information Systems*, pp. 129-134. Ann Arbor: University of Michigan, July 1976.



Keen, P. G. W., and E. M. Gerson, "The Politics of Software Engineering." *Datamation*, pp. 80-86, Nov. 1977.

Keen, P. G. W., "Towards a Behavioral Methodology for Study of OR/MS/MIS Implementation." Cambridge, Mass.: Sloan School of Management, M. I. T., Working Paper 701-74, 1974.

Keen, P. G. W., "Cognitive Style and the Problem-solving Process: An Experiment." Cambridge, Mass.: Sloan School of Management, M. I. T., Working Paper 700-74, March 1974.

Keeney, Ralph L. and Raiffa, Howard, *Decisions with Multiple Objectives: Preferences and Value Tradeoffs*, John Wiley & Sons, New York, 1976.

Keim, R. T., and Kilmann, R. J. , "A Longitudinal Investigation of Alternative Implementation Processes: Traditional Versus Behavioral Model Building with the MAPS Design Technology." In P. G. W. Keen (ed.), *The Implementation of Computer-Based Decision Aids*. Cambridge, Mass.: Proceedings of a Conference Sponsored by the Center for Information Systems Research, M. I. T., April 3-5, 1975.

Kegerreis, Robert, "Marketing Management and the Computer: An Overview of Conflict and Contrast", *Journal of Marketing*, Vol. 35, Jan. 1971, pp. 3-12, 1971.

Kelly, G., *The Psychology of Personal Constructs*, Vol. 2, Norton, New York, 1955.

Kelly, H. H. and Thibaut, J. W., "Experimental Studies of Group Problem Solving and Process," In: G. Lindzey, (Ed.), *Handbook of Social Psychology*, Vol. 2, Cambridge. Addison-Wesley, pp. 735-785, 1954.

Kelly, Joe, "The Study of Executive Behavior by Activity Sampling," *Human Relations*, Vol 17, pp. 277-278, 1964.

Kendall, M. G., *Rank Correlation Methods*, Griffin, London, 1948.

Kilmann, L. R. Pondy, and D. P. Slevin (eds.), *The Management of Organization Design: Strategies and Implementation*, Vol. 1, pp. 251-294. New York: American Elsevier, 1976.

Kilmann, R. H., and McKelvey, W. W., "The MAPS Route to Better Organization Design." *California Management Review*, Vol. 17, No. 3, pp. 23-31, Spring 1975.

Klass, Richard L., *A DSS for Airline Management*, *Data Base*, Vol. 8, No. 3, 1977.

Klammer, Thomas, "Empirical Evidence of the Adoption of Sophisticated Capital Budgeting Techniques," *Journal of Business*, Vol. 25, pp. 387-398, 1972.

Klein, B., and Meckling, W., "Applications of Operations Research to Development Decisions." *Operations Research*, Vol. 6, No. 3, pp. 352-363, May-June, 1958.

Kluckhohn, Clyde, *Mirror for Man*, McGraw-Hill Book Company, Inc., New York, pp. 113-38, 1949.

Kluckhohn, Clyde, and Murray, H., Eds., *Personality in Nature, Society, and Culture*, A. Knopf, New York, 1961.

Knight, K. E. "A Study of Technological Innovation- The Evolution of Digital Computers." Ph.D. Dissertation, Carnegie Institute of Technology, 1963.

Knight, K. E., and Miller, J. A. *Impact of Computers on Management*, unpublished paper from the Graduate School of Business, Stanford University, delivered at the 14th International Meeting of TIMS, Mexico City, 1967.

Knuth, D. E., *The Art of Computer Programming*. Reading, Mass.: Addison-Wesley, 1968.

Kolb, D. A., and Frohman, A. L., "An Organization Development Approach to Consulting." *Sloan Management Review*, Vol. 12, No. 1, pp. 51-65, Fall 1970.

Kotler, P., "Toward an Explicit Model for Media Selection," *J. Advertising Res.* 4, 34-41, Mar. 1964.

Kriebel, C. H., "MIS Technology - A View of the Future." Paper presented at the Spring Joint Computer Conference, Atlantic City, N. J., May 16-18, 1972.

Kriebel C. H., Richar Van Horn, and J. Timothy Heames, *Management Information Systems: Progress and Perspectives*, Graduate School of Industrial Administration, Carnegie Mellon University, 1971.

Kuehn, A. A., McGuire, T. W. McGuire, and Weiss, D. L., "Measuring the Effectiveness of Advertising," *Proc. Fall Conference American Marketing Assoc.*, pp. 185-194, 1966.

Kuhn, Thomas, *The Structure of Scientific Revolutions*, Chicago: University of Chicago Press, 1962.

Kuhn, Thomas, "The Essential Tension: Tradition and Innovation in Scientific Research," in C. W. Taylor and F. Barron, eds., *Scientific Creativity*, Wiley, pp. 341-354, 1963.

Lambin, J. J., "A Computer On-Line Marketing Mix Model." *J. Marketing Res.* 9, 119-126, May 1972.

Langefors, Borge and Samuelson, Kjell, *Information and Data in Systems*, Petrocelli/Charter, New York, 1976.

Larreche, J-C., "Managers and Marketing Models: A Search for a Better Match." Ph.D. Dissertation, Stanford Business School, 1974.

Larreche, J-C., and Montgomery, D. B., A Framework for the Comparison of Marketing Models: A Delphi Study. Cambridge, Mass.: Marketing Institute Technical Report 77-102, 1977.

Laudon, K., Computers and Bureaucratic Reform. New York: Wiley-Interscience, 1974.

Lave, D. A., and J. G. March. An Introduction to Models in the Social Sciences. New York: Harper & Ros, 1975.

Lawrence, P. R., and Lorsch, J. W., Organization and Environment. Cambridge, Mass.: Division of Research, Harvard Business School, 1967.

Leavitt, Harold, "The Volatile Organization: Everything Triggers Everything Else", Chapter 21 of Managerial Psychology Chicago: University of Chicago Press, 1964.

Leavitt Harold, Applied Organizational Change in Industry: Structural, Technological and Humanistic Approaches." In J. G. March (ed.), Handbook of Organizations. Chicago: Rand McNally, 1965.

Leavitt, Harold, "Beyond the Analytic Manager." California Management Review, Vol. 17, No. 3, pp. 5-12, Spring 1976; Vol. 17, No. 4, pp. 11-21, Summer 1976.

Leavitt, Harold, and Whisler, T. L. "Management in the 1980's." Harvard Business Review, Vol 36, No.6, pp. 41-48, Nov. Dec. 1958.

Lewin, K. "Group Decision and Social Change." In T. M. Newcomb and E. L. Hartley (eds.), Readings in Social Psychology, pp. 330-344. New York: Holt, 1947.

Lindblom, C. E., "The Science of Muddling Through." Public Administration Review, Vol. 19, pp. 79-88, 1959.

Lippman, Lawrence, Advanced Business Systems, New York: American Management Association Study #86, 1968.

Litt, Benjamin, "Toward a Model of the Unstructured Problem Solving Process: A Taxonomy of Primitive Terms", Proceedings of the American Institute for Decision Sciences, 1973 Northeast Regional Conference, pp. 28-34, 1973.

Little, John D. C., Models and Managers: The Concept of a Decision Calculus," Management Science, Vol. 16, No. 8, pp. B466-B485, 1970.

Little, John D. C., "BRANDAID: An On-Line Marketing Mix Model," Alfred P. Sloan School Working Paper 586-72, M.I.T., 1972.

- Little, John D. C. and Lodish, L. M., "A Media Planning Calculus," *Opns. Res* 17, 1-35, January 1969.
- Little, John D. C., "A Model of Adaptive Control of Promotional Spending," *Operations Research*, Vol. 14, pp. 1075-1098, 1966.
- Lodish, L. M., "Empirical Studies on Individual Response to Exposure Patterns," *J. Marketing Res.* 8, 212-218, 1971.
- Lodish, L. M., "CALLPLAN: An Interactive Salesman's Call Planning System," *Management Sci.* 18, 25-40, Dec. 1971.
- Lodish, L. M., Monthomery, D. B. and Webster, Jr., F. E., "A Dynamic Sales Call Policy Model," Working Paper 329-68, Sloan School of Management, MIT. The paper was presented at the joint ORSA-TIMS meeting in San Francisco, May 1-3, 1968.
- Loomis, M. J. F. Nunamaker and B. P. Konsynski an Approach to an Administration DSS, "Data Base," Vol. 8, No. 3, 1977.
- Lonnstedt, Lars, "Factors Related to the Implementation of Operations Research Solutions", Interfaces, Vol. 5 #2, Feb. 1975, pp. 23-30, 1975.
- Lucas, Henry, "Behavioral Factors in System Implementation", Graduate School of Business, Stanford University, Research Paper #88, 1978.
- Lucas, Henry Jr., "A Descriptive Model of Information Systems in the Context of the Organization." *Databases* 4(2,3 and 4), pp. 27-36, 1973.
- Lucas Henry Jr., and Plimpton, R., "Technological Consulting in a Grass Root, Action-Oriented Organization," *Sloan Management Review*, Vol. 14, No.1, pp. 17-36, 1972.
- Lucas, Henry, "Systems quality, user reactions, and the use of information", Management Informatics, Vol. 3, #4, pp. 207-212, 1974.
- Lucas, Henry, The Integration of Data Processing and the Organization, Unpublished Ph.D. Dissertation, Sloan School of Management MIT, 1970.
- Lucas Henry, Why Information Systems Fail. Columbia University Press, New York, 1975.
- Luce, R. Duncan and Raiffa, Howard, *Games and Decisions*, Wiley, New York, 1958.
- Lusk, E., "Cognitive Aspects of Annual Reports: Field Independence/Dependence," *Empirical Research in Accounting: Selected Studies 1973*, Supplement to *Journal of Accounting Research*. pp. 191-202, 1973.
- Luske, E., "Cognition: A Study of Its Effects on Abstraction of Decision Information," Working Paper, The Wharton School, University of Pennsylvania.
- Malcolm, D. G. "On the Need for Improvement in Implementation in Implementation of OR," *Management Sci.* 11, B54-B57, 1965.

Malcolm, D. G., "Status of Operations Research in Industry," opns. Res. 2, 211-213, 1954.

Malhotra, Ashok, "A Descriptive Model of Detailed Problem Finding Behavior" Working Paper #695-74, Sloan School of Management, MIT, 1974.

Malhotra, Ashok, A Knowledge Based Question Answering System for Management, unpublished Ph.D. Dissertation, Sloan School of Management, MIT, 1975.

Malhotra, A., On Problem Diagnosis. Yorktown Heights, N.Y.: IBM Thomas G. Watson Research Center Paper RC 5498, July 2, 1975.

March, J. G. "The Technology of Foolishness." *Civilkonomen*, Vol. 18, No. 4 pp. 7-12, May 1971.

March, J. G., and Simon, H. A., *Organizations*. New York: Wiley, 1958.

March, J. G., and Simon, Herbert A., *Organizations*, Wiley, New York, 1966.

Markowitz, H. M. *Portfolio Selection: Efficient Diversification of Investments*. New York: Wiley, 1959.

Marples, D. L., "Studies of Managers - A Fresh Start?," *The Journal of Management Studies*, Vol 4, pp. 282-299, 1967.

Martin, James, Design of Man-Computer Dialogues. Englewood Cliffs, N. J.: Prentice-Hall, 1973.

Martin, M. J. C., Pense, S. G., "Transactional Analysis: Another Way of Approaching OR/MS Implementation," *Interfaces*, Vol. 7 No. 2, February 1977.

Mason, D., "Management Information Systems: What They Are, What They Ought to Be." *Innovation*, Vol. 12, 1970.

Mason, D., and Mitroff, I., "A Program for Research on Management Information Systems," *Management Science*, Vol. 18, No. 5, pp. 475-487, Jan. 1973.

Mason, Richard O., "A Dialectical Approach to Strategic Planning," *Management Science*, Vol 15, No. 8, pp. B-403-B-414, 1969.

Mason, Richard O., and Mitroff, I.I., "A Program for Research on Management Information Systems." *Management Science*, Vol 19, No. 5, pp. 475-487, Jan. 1973.

Mathes, R. C., "'D' People and 'S' People (letter)," *Science*, Vol. 164, pp. 630, 1969.

McClelland, Davis C., "On the Dynamics of Creative Physical Scientists," in *The Ecology of Human Intelligence*, Liam Hudson, ed., Penguin, England, pp. 309-341, 1970.

McCosh, Andrew M. and Michael S. Scott Morton Management Decision Support Systems A Halsted Press Book, John Wiley & Sons, New York, 1975.

McCoubrey, C. A., and Sulg. M., "A Case Study of OR/MS Implementation in an Industrial Environment." In P. G. W. Keen (ed.), The Implementation of Computer-Based Decision Aids, 1975.

McDonough, A. M., Information Economics and Management Systems. New York: McGraw-Hill, 1963.

McDonough, A. M. and Garrett, L. J., Management Systems, R. D. Irwin and Co., pp. 18-19-, 1965.

McGrath, Joseph, "Toward a 'Theory of Method' for Research on Organizations", in W. W. Cooper, H. J. Leavitt, and M. W. Shelley, eds., New Perspectives in Organization Research, New York: John Wiley, 1964.

McGregor, Douglas, The Human Side of Enterprise, McGraw-Hill Book Company, Inc., New York, 1960.

McKenney, J. and Keen, P., "How Do Managers Think?" Harvard Business Review, Vol. 52, No. 3, pp. 79-90, 1974.

McKenney, J. L. and Keen, P. G. W., "How Managers' Minds Work." Harvard Business Review, Vol. 52, No. 3, pp. 79-90, May-June 1974.

McKinsey Corporation. Unlocking the Computer's Profit Potential. New York: McKinsey Corp., 1968.

McLean, Ephraim R., and Thomas F. Riesing, MAPP: A DSS for Financial Planning, Data Base, Vol. 8, No. 3, 1977.

Meador, C. L., and Ness, D. N., "Decision Support Systems: An Application to Corporate Planning." Sloan Management Review, Vol. 15, No. 2, pp. 51-68, Winter 1974.

Meador, C. Lawrence, "The Projector On-Line Planning System." Cambridge, Mass.: MIT Sloan School of Management, 1972.

Meadows, D.J., et al. The Limits to Growth. New York: Signet, 1972.

Meder, H. G. and Palermo, F. P., Data Base Support and Interactive Graphics In Proceedings of 3rd International Conference on Very Large Data Bases, Tokyo, Japan, pp. 396-402, 1977.

Meehl, Paul E., Clinical Versus Statistical Prediction, University of Minnesota Press, Minneapolis, 1954.

Meldman, J. "Decision Support Systems for Legal Research." Paper presented at the II Symposium Nacional de Sistemas Computacionales, Monterrey, Mexico, March 15-18, 1977.

Merton, Robert K., Social Theory and Social Structure, New York: Free Press, 1957.

Messick, Samuel and Ross, John (eds.), Measurement in Personality and Cognition, Part III: Stylistic Consistencies in Cognition, John Wiley and Sons, Inc., New York, pp. 171-215, 1962.

Miles, W. Martin, "The Measurement of Value of Scientific Information," in Operations Research in Research and Development, Burton V. Dean, ed., John Wiley, New York, 1963.

Miller, David W. and Starr, Martin K., Executive Decisions and Operations Research Prentice-Hall, Inc., Englewood Cliffs, N. J., pp. 415-434, 1960.

Miller, Ernest , Advanced Techniques for Strategic Planning AMA Research Study #104, American Management Association , 1971.

Miller, R. B. , "Aexgwrtowa of Man-Computer Problem Solving", Ergonomics, Vol. 12, #4, pp. 559- 581, 1969.

Miller, R. B., "Psychology for a Man-Machine Problem Solving System", in Lee Thayer, ed., Communication Theory and Research, Proceeding of the first International Symposium. Springfield, Illinois: Charles Thomas, Publisher , 1967.

Miller, R. B., "Response Time in Man-Computer Conversation Transactions." American Federation of Information Processing Societies, Fall Joint Computer Conference, San Francisco, California, 1968 Proceedings, Vol. 33, pt. 1, Thompson Book Company, Washington, D. C. , pp. 267-277, 1968.

Miller, R. B., "Task Descriptive and Analysis" in Robert Gagne, ed., Psychological Principles in System Development. New York: Holt, Rinehart, and Winston , 1962.

Miller, R. D., "Multidimensional Processes of Implementing Computer Based Models." D. B. A. Thesis, Harvard Business School, 1974.

Mills, Robert C.III, "Liaison Actuvutues at R&D Interfaces: A Model, Some Empirical Results and Design Considerations for Further Study," Northwestern Master's Thesis, June 1967.

Minas, J. S., "Formalism, Realism, and Management Science," Management Science, Vol. 3 , pp. 9-14, 1956.

Minsky, Marvin , "A Framework for Representing Knowledge ", memo #306, Artificial Intelligence Laboratory, MIT, Cambridge, Mass , 1973.

Minsky Marvin, Computation, Finite and Infinite Machines. Englewood Cliffs, N. J.: Prentice-Hall, 1967.

Minsky Marvin, (ed.). Semantic Information Processing, Cambridge, Mass.: M.I.T., 1968.

Mintzberg, Henry, "Managerial Work: Analysis From OBservation", Management Science, Vol 18, No. 2, October 1971.

Mintzberg Henry, "Structured Observation as a Method to Study Managerial Work, " The Journal of Management Studies, Vol. 7 , pp. 87-104, 1970.

Mintzberg Henry, The Nature of Managerial Work. Harper and Row, New York 1973.

Mintzberg Henry, Raisinighani, D., and Theoret, A., The Structure of "un-structured" decision processes. Administrative Science Quarterly, 21 , pp. 246-275, 1976.

Mitroff, Ian I., "On the General Problem of Building a Generalized Model of General Models," (in preparation).

Mitroff, Ian I., Betz, Frederick and Mason, Richard O., "A Mathematical Model of Churchmanian Inquiring Systems with Special Reference to Popper's Mearsures for the 'Severity of Scientific Tests'," Theory and Decision, Vol. 1, No. 2 , pp. 155-178, 1970.

Mitroff, Ian I., "Epistemology as a Basis for Building a Generalized model of General Policy-Sciences Models," Management Science, to appear.

Mitroff, Ian, John Nelson, and Richard Mason "Management Myth - Information Systems", Management Science, Vol. 21, #4, pp. 371-382 , 1974.

Mitroff, Ian, Frederick Betz, Louis Pndy, and Francisco Sagasti "On Managing Science in the Systems Age: Two Schemas for the Study of Science as a Whole Systems Phenomenon", Interfaces, Vol. 4, #3, pp. 46-57 , 1974.

Mitroff, Ian and Kilmann, Ralph "On the Importance of Qualitative Analysis in Management Science: The Influence of Personality Variables in Organizational Decision Making". University of Pittsburgh Working Paper #67 , 1974.

Mitroff, Ian I., The Subjective Side of Science: A Philosophical Enquiry into the Psychology of the Appollo Moon Scientistis. New York: Elsevier, 1975.

Mogar, Robert E., "Toward a Psychological Theory of Education," of Humanistic Psychology, Vol. IX, No. 1, pp. 17-52, 1969.

Mogni, Ben , "The Computer's Role in Marketing". New York: American Management Association, Management Bulletin #126 , 1969.

Montgomery, D. B., and Urban, G. L., Management Science in Marketing. Englewood Cliffs, N. J.: Prentice-Hall, 1969.



Montgomery, D. B., and Urban, G. L., "Marketing Decision-Information Systems: An Emerging View." Journal of Marketing Research. Vol. 7, No. 2, pp. 226-234, May 1970.

Montgomery, David "The Outlook for MIS", Journal of Advertising Research, Vol. 13, #3, pp. 5-11, 1973.

Morgan, H. L., and Soden, J. V., "Understanding MIS Failures." Data Base, Vol. 5, Nos. 2, 3, 4, pp. 146-167, Winter 1973.

Morris, William T., "Tntuituin and Relevance," Management Science, Vol. 14, No. 4, pp. B-157-B-165, 1967.

Morris, William T., Management Science in Action, Richard D. Irwin, Inc., Homewood, Ill., 1963.

Morris, William T., "On the Art of Modeling," Management Science, Vol. 13, pp. 707-717, 1969.

Morton, M. S. Scott, Management Decision Systems, Division of Research Graduate School of Business Administration, Harvard University, Boston, 1971.

Morton, M. S. Scott. Management Decision Systems: Computer Based Support for Decision Making. Cambridge, Mass.: Division of Research, Harvard, 1971.

Morton, M. S. Scott. "Decision Support Systems: Some Lessons from an On-going Application." Paper presented at the International Federation for Information Processing Congress, Stockholm, Sweden, August 1974.

Morton, M. S. Scott. "Strategy for the Decision and Evaluation of an Interactive Display System for Management Planning," Alfred P. Sloan School Working Paper 439-470. M.I.T., 1970.

Moshowitz, A., The Conquest of Will. Reading, Mass.: Addison-Wesley, 1976.

Mumford, E. and Ward, T., "Computer Technologists," Journal of Management Studies, 3(3), pp. 244-255. 1966.

Mumford, E., Job Satisfaction: A Study of Computer Specialists. London: Longmans, 1972.

Mumford, E. and Ward, T. B., Computers: Planning for People. London: Batsford, 1968.

Murray, H. A., Explorations of Personality, Oxford, New York, 1938.

Murray, H. A., Myth and Mythmaking. New York: George Braziler, 1960.

Myers, Charles A., (ed.), The Impact of Computers on Management, The M.I.T. Press, Cambridge, Mass., 1967.

Myland David and Radnor, Michael, "The Adoption and Diffusion of OR/MS Activities in Business and Government: US and Overseas-Annotated Bibliography," Northwestern University, July 1963.

Nash, David R., Building EIS, A Utility for Decisions, Data Base, Vol. 8, No.3, 1977.

Neal, R. D., and Radnor, M., "Relation between Formal Procedures for Pursuing OR/MS Activities and OR/MS Group Success." Operations Research, Vol. 21, No. 2, pp. 451-474, March-April 1973.

Ness, D. N., "Decision Support Systems: Theories of Design." Paper presented at the Wharton Office of Naval Research Conference on Decision Support Systems, University of Pennsylvania, Philadelphia, Penn., November 4-7, 1975.

Neuschel, Richard F., "Presenting and Selling Recommendations," Chapter 15, in Management by System, McGraw-Hill, New York, Second Edition.

Newell, A. and Simon, H.A., Human Problem Solving. Prentice-Hall, Inc. Englewood Cliffs, N. J. , 1972.

Newell, Shaw and Simon. "Elements of a Theory of Human Problem Solving," Psychological Review, Vol. 65, 1958.

Newell, A. , J. C. Shaw, and H. A. Simon. "Empirical Explorations of the Logic Theory Machine: A Case Study in Heuristics." Proceedings of the 1957 Western Joint Computer Conference, pp. 218-230, February 26-28, 1957.

Newell, A., J. C. Shaw, and H. A. Simon. "The Processes of Creative Thinking." In H. E. Gruber and M. Wertheimer (eds.), Contemporary Approaches to Creative Thinking. New York: Atherton, 1962.

Newell, Alan , "Heuristic Programming: III-Structured Problems", in J. Aronofsky, ed., Progress in Operations Research, Vol. III. New York: John Wiley , 1969.

Nickerson, R. S., "Man-Computer Interaction: A Challenge for Human Factors Research", Ergonomics, Vol. 12, #4, pp. 501-517 , 1969.

Nickerson, R. S. and Feehrer, C. E. Decision making and training. BBN Report No. 2982. Bolt Beranek and Newman, Inc., Cambridge, Mass., July 1975.

Nield, P. G. , "Financial Planning in British Industry", Journal of Business Policy, Vol. 3, #3, pp. 11-18 , 1973.

Nolan, R. L., "Plight of the EDP Manager.: Harvard Business Review, Vol. 51, No. 2, pp. 143-152, May-June 1973 .

Nolan, R. L., "Managing the Computer Resource: A Stage Hypothesis." Communications of the Association for Computing Machinery, Vol. 16, No. 7, pp. 399-405, July 1973 .

Nolan, R. L. and Gibson, C. F., "Managing the Four Stages of EDP Growth." Harvard Business Review, Vol. 52, No.1, pp. 76-88, Jan.-Feb. 1974.

Norman, W. E. , The Impact of Computer Techniques on Road Transport Planning. New York: Science Associates International

O'Brien, James , The Impact of Computers on Banking. Boston: Bankers Publishing Company , 1968.

ONLINE 72, Proceedings of the International Conference on the Design and Application of Online Interactive Computer Systems, Online Computer Systems, Ltd., Middlesex, England, 1972.

Parkhill, Douglas , The Challenge of the Computer Utility. Reading, Mass.: Addison-Wesley , 1966.

Parsons, Henry , Man-Machine System Experiments. Baltimore: Johns Hopkins Press , 1972.

Parsons, Talcott, Structure and Process in Modern Societies, The Free Press, New York, 1960.

Peace, D. M. S. and Easterby, R. S., "The Evaluation of User Interaction with Computer Based Management Information Systems", Human Factors, Vol. 15, #2, pp. 163-177 , 1973.

Pennycuik, K., "Presentation and Implementation of the Results of OR," in R. T. Eddison, K. Pennycuik, and B. H. P. Rivett, OR for Management, pp. 288-298, Wiley, New York, 1962.

Pettigrew, A., The Politics of Organizational Decision Making. London: Tavistock, 1976.

Pettigrew, T., "The Measurement and Correlates of Category Width as a Cognitive Variable," Journal of Personality, Vol. 26, pp. 532-44, 1952.

Piaget, Jean, Structuralism, Basic Books, New York, 1970.

Popper, Karl R., Conjectures and Refutations, Basic Books, New York, 1962.

Pounds, W. F., "The Process of Problem Finding." Industrial Management Review, Vol. 11, No. 1, pp. 1-19, Fall 1969.

Pratt, John W., Raiffa, Howard and Schlaifer, Robert, "The Foundations of Decision Under Uncertainty: An Elementary Exposition," J. Amer. Stat. Assoc., Vol. 59, pp. 353-375.

Pressman, J. L., and A. Wildavsky, Implementation. Berkeley: University of California Press, 1973.

Quade, E. S., and W. I. Boucher (eds.). Systems Analysis and Policy Planning: Applications in Defense. New York: Elsevier, 1968.

Rader, Louis T., "Roadblocks to Progress in the Management Sciences and Operations research," Management Science, Vol. 11, No. 4 , p. C-1-C-5, 1965.

Radnor Michael and Rubinstein, Albert H., "Implementation in Operations Research and R & D in Government and Business Organization," Operations Research, Vol. 18, pp. 967-991, 1970.

Radnor, Michael, Rubenstein, Albert H. and Bean, Alden S., "Integration and Utilization of Management Science Activities in Organizations," paper presented at Annual Conference of British Operational Research Society, Reading University, September 1966.

Radnor, Michael and Rodeney D. Neal, "The Progress of Management Science Activities in Large U.S. Industrial Corporations," Opns. Res. 21, 427-450, 1973.

Raiffa Howard, Decision Analysis, Addison-Wesley, Reading, Mass., 1968.

Rainio, Kullervo, "A Stochastic Model of Social Interaction," Trans. of the Westernmark Society, Vol. VII, Turku, Finland, 1961.

Rappaport, Alfred, Ed., Information for Decision-Making: Quantitative and Behavioral Dimensions, Prentice-Hall, Englewood Cliffs, New Jersey, 1970.

Ratoosh, Philburn and Churchman, C. West, "Innovation in Group Behavior," Center for Research in Management Science, University of California, Berkeley, Working Paper No. 10, January 1960.

Reisman, Arnold and Cornelius de Kluyver (1973): "Strategies for Implementing Systems Studies", paper presented to the Research Conference on the Implementation of OR/MS Models, University of Pittsburgh, Pittsburgh Pennsylvania, Nov. 15-17, 1973.

Reisner, P., Use of Psychological Experimentation as an Aid to Development of a Query Language, IEEE Trans. Software Eng., SE-3(3): 218-229, May 1977.

Rittel Horst, "Some Principles for the Design of an Educational System for Design," Journal of Architectural Education, Vol. XXVI, Nos. 1 and 2 pp. 16-27, 1971.

Rivett Patrick, Principles of Model Building, Wiley, New York, p.7, 1972.

Rose, Arnold, "The Relation of Theory and Method," in Sociological Theory: Inquiries and Paradigms, Harper and Row, New York, 1967.

Roy, John E. and Miller, James G., "The Acquisition and Application of Information in the Problem-Solving Process: An Electronically Operated Logical Test," Behavioral Science, Vol. 2, No. 4, pp.291-300, 1957.

Rubenstein, A. H., et al. "Some Organizational Factors Relating to the Effectiveness of Management Science Groups in Industry." Management Science, Vol. 13, No. 8, pp. B508-518, 1967.

Rubenstein, A. H., "Shades of Project-Selection Behavior in Industry," in Burton V. Dean (ed.), Operations Research in Research and Development, Wiley, New York, 1963.

Rubenstein, A. H., "Studies of Liaison, Interface, and Technical Transfer in R&D," Excerpts from a Northwestern University Proposal, April 1968.

- Rubenstein, A. H., "A Real Time Study of Information Requirements for Project Selection in R&D," Document 66/28, Department of IE/MS, Northwestern University, Evanston, Illinois, 1966.
- Rubenstein, A. H., "Integration of Operations Research Into the Firm," The Journal of Industrial Engineering, September-October, pp. 421-428, 1960.
- Rubenstein, A. H., and McColly, John B., "Phases in the Life Cycle of Industrial Operations Research Groups," Department of Industrial Engineering and Management Sciences, Northwestern University, 1961.
- Sackman, Harold, "Stages of Problem Solving with and without Computers", Rand Corporation, R1490-NSF, May 1974.
- Sackman, Harold and Ronald Citrenbaum, On-Line Planning: Towards Creative problem solving. Englewood Cliffs, N. J.: Prentice-Hall, 1972.
- Samuels, A. L., "Some Studies in Machine Learning Using the Game of Checkers." IBM Journal of Research and Development, Vol. 2, No. 3, pp. 210-229, July 1959.
- Sammet, J. Programming Languages: History and Fundamentals. Englewood Cliffs, N. J.: Prentice-Hall, 1969.
- Sapolsky, Harold                      The Polaris System Development, Harvard University Press, Cambridge, Mass., 1972.
- Sashkin, Marshall, William Morris, and Leslie Horst, "A Comparison of Social and Organizational Change Models", Psychological Review, Vol. 80, #6, pp. 510-526, 1973.
- Selfridge, O. G., "Pattern Recognition and Modern Computers," and G. P. Dinneen, "Programming Pattern Recognition," Both in Proceedings of the 1955 Western Joint Computer Conference, IRE, 1955.
- Semlow, W. S., "How Many Salesmen Do you Need?", Harvard Business Review Vol. XXXVIII, pp. 126-132, 1959.
- Schein, Edgar, "The Mechanism of Change", pp. 362-278 in Bennis, Schein, Steele, and Berlew, eds., Interpersonal Dynamics, Homewood, Illinois: The Dorsey Press, 1964.
- Schein, E. H. "Management Development as a Process of Influence." Industrial Management Review, Vol. 2, No. 2, pp. 59-77, Spring 1961.
- Schein, E. H., Brainwashing. Cambridge, Mass.: Center for International Studies, M.I.T. 1961.
- Schein, E. H., Process Consultation: Its Role In Organization Development, Addison-Wesley, Reading, Mass., 1969.
- Schellenberger, Robert, "Criteria for Assessing Model Validity for Managerial Purposes", Decision Sciences, Vol. 5, pp. 644-653, 1974.
- Schelling, T. C. The Strategy of Conflict. Oxford: Oxford University Press, 1963.

Schräge, Linus "The Modeling of Man-Computer Interactive Systems", Report #6942, Center for Mathematical Studies In Business and Economics, University of Chicago, 1969.

Schreiber, Albert, Corporate Simulation Models. Seattle: University of Washington, 1970.

Schroder, H. M., M. J. Driver, and S. Steufert. Human Information Processing. New York: Holt, 1967.

Schroder, H., "Conceptual Complexity and Personality Organization," in Personality Theory and Information Processing. H. Schroder and P. Suedfeld, eds., Ronald Press, New York, pp. 240-73, 1971.

Schrot, M. E., A School-Closure Decision Process: Observations on the Use of an Interactive System, IBM Research Report RJ-1972.

Schultz, G. P., and T. L. Whisler (eds.). Management Organization and the Computer, Glencoe, IL: Free Press, 1960.

Schultz, Randall and Dennis Slevin, "Implementation and Organization Validity: An Empirical Investigation", Krannert Graduate School of Industrial Administration, Purdue University, paper #436, 1973.

Schumacher, C. D. and Smith, B. E., "A Sample Survey of Industrial Operations-Research Activities II," Opns, Res. 13, 1023-1027, 1965.

Scott Morton, Michael, "Decision Support Systems -- The Design Process", Sloan School of Management, MIT, Working Paper #686-73, 1973.

Scott Morton, S., Management Decision Systems: Computer -Based Support for Decision-Making, Harvard University, Division of Research, Graduate School of Business Administration, Boston, 1971.

Scott Morton, Michael, "Interactive Visual Display Systems and Management Problem Solving", Industrial Management Review, Fall 1967, pp. 69-81, 1967.

Scott Morton, Michael, Management Decision Systems, Boston: Division of Research, Harvard Business School, 1971.

Scott, W., "Varieties of Cognitive Integration," Journal of Personality and Social Psychology, Vol 39, No. 4, pp. 563-78, 1974.

Scott, W., "Cognitive Complexity and Cognitive Flexibility," Sociometry, Vol. 25, pp. 405-14, 1962.

Shackel, B., "Man-Computer Interaction--The Contribution of the Human Sciences" IEEE Trans on Man-Machine Systems, pp. 149-163, 1969.

Shaffer, Richard A., "Electronic Gadgets that Can Talk, Spell May Open New Path for Consumer Goods," Wall Street Journal, p. 12, 1978.

Shakun Melvin, "Management Science and Management: Implementing Management Science vis Situational Normativism," Management Science, Vol. 18, pp. 367-377, 1972.

Shannon, C. E., and Weaver, W., A Mathematical Theory of Communication. Urbana, Ill.: University of Illinois Press, 1949.

Shannon, R. E. Systems Simulation: The Art and Science. Englewood Cliffs, N. J.: Prentice-Hall, 1975.

Sharpe, W. F., "A Simplified Model for Portfolio Analysis." Management Science, Vol. 9, No. 10, pp. 277-293, Jan. 1963.

Shorliffe, E. H., Computer-Based Medical Consultations: MYCIN. New York: Elsevier, 1976.

Simon, H. A. "A Behavioral Model of Rational Choice." In J. A. Simon, Models of Man, pp. 241-260. New York: Wiley, 1957.

Simon, H. A., The New Science of Management Decision. New York: Harper & Row, 1960.

Simon, H. A., The Shape of Automation for Men and Management. New York: Harper & Row, 1965.

Simon, H. A., Sciences of the Artificial, Cambridge, Mass.: M.I.T., 1969.

Simon, H. A., Administrative Behavior, 3rd ed. New York: Macmillan, 1976.

Simon, H. A., and A. Newell. "Heuristic Problem Solving: The Next Advance in Operations Research." Operations Research, Vol. 6, No. 1, pp. 1-10, Jan.-Feb. 1958.

Simon, H. A., Models of Man, John Wiley, New York, 1957.

Singer, D. L. and Singer, J. L., "Personality," Annual Review of Psychology, Mussen and Rosenzweig, eds., Annual Review, Inc., Palo Alto, 1972.

Singer, E. A., Experience and Reflection, C. West Churchman, ed., University of Pennsylvania Press, Philadelphia, 1959.

Slevin, Susan, "An Annotated Bibliography on the Implementation of Operations Research/Management Science Techniques", prepared in Conjunction with the Research Conference on the Implementation of OR/MS Models, University of Pittsburgh, Nov. 15-17, 1973.

Smith, R. D., R. Brown, R. H. Culhan, and R. D. Amspoker (1973): "Operations Research Effectiveness: An Empirical Study of Fourteen Project Groups", paper presented to the Research Conference on the Implementation of OR/MS Models, University of Pittsburgh, Nov. 15-17, 1973.

Sorensen, R. E., and D. E. Zand. "Improving the Implementation of OR/MS Models by Applying the Lewis/Schein Theory of Change." Paper presented at the Research Conference on the Implementation of OR/MS Models, University of Pittsburgh, Pittsburgh, Penn., November 15-17, 1973.

Sounder, W. E., "Analytical Effectiveness of Mathematical Models for R & D Project Selection." *Management Science*, Vol. 19, No. 8, pp. 907-923, April 1973.

Sound, W. E., "A Scoring Methodology for Assessing the Suitability of Management Science Models," *Management Science*, Vol. 18, No. 10 pp. 526-543, 1972.

Sprague, Christopher "Barriers to Progress in Information System Design: Technological or Not", *Data Base*, Vol. 5, pp. 115-119, 1973.

Sprague, Richard, *Information Utilities*, Englewood Cliffs, N. J.: Prentice-Hall, 1969.

Spranger, E., *Types of Men*, Newmayer, Halle, 1928.

Stabell, D. B. "Individual Differences in Managerial Decision Making Processes: A Study of Conversational Computer Usage.: Ph.D. Dissertation, M.I.T., 1974.

Stabell, D. B., "On the Development of the Decision Support Systems as a Marketing Problem." Paper presented at the International Federation for Information Processing Congress, Stockholm, Sweden, August 1974.

Stabell, D. B., Design and Implementation of Decision Support Systems: Some Implications of a Recent Study." In P. G. W. Keen (ed.), *The Implementation of Computer-Based Decision Aids*. Cambridge, Mass.: Proceedings of a Conference Sponsored by the Center for Information Systems Research, M.I.T., April 3-5, 1975.

Stabell, C. B., "Decision Research: Description and Diagnosis of Decision Making in Organizations." In D. Heradstreit and O. Narvesen (eds.), *Decision Making Research: Some Developments*. Oslo, Norway: Norsk Utenriks Politisk Institute, 1977.

Starmer, Frank C., and Rosati, Robert A., A DSS for Managing Patients with a Chronic Illness, *Data Base*, Vol 8, No. 3, 1977.

Stasch, Stanley, "Systems Analysis for Controlling and Improving Marketing Performance", *Journal of Marketing*, Vol. 33, pp. 12-19, 1964.

Starr, M. K. "The Politics of Management Science." *Interfaces*, Vol. 1, No. 4, pp. 31-37, June 1971.

Starr, M. K., and M. Zeleny (eds.) *Multi-Criteria Decision Making*. The Institute of Management Sciences Studies in the Management Sciences, Vol. 6, 1977.

Steinbruner, J. D., *The Cybernetic Theory of Decision*. Princeton, N. J.: Princeton University Press, 1974.

Sterling, T. D. "Humanized Computer Systems." *Science*, Vol. 190, No. 4220, pp. 1168-1172, Dec. 19, 1975.

Stewart, Rosemary, *How Computers Affect Management*. Cambridge, Mass.: MIT Press



- Stillson, Paul, "Implementation Problems in OR,: Opns. Res. 11, 140-147, 1963.
- Sutton, Jimmy A., Evaluation of a Decision Support System: A Case Study with the Office Products Division of IBM, IBM Research Laboratory, San Jose, CA 95193, Report #RJ-2214.
- Swan, A. W., "Running an Or Department in an Industrial Organization," J. Indust. Eng. 8, 269-274 ,1957.
- Swift,R., Mack, M. and J. M. Descarpentries, Unlocking the Computers Profit Potential, McKinsey, New York, 1969.
- Time Sharing Information Services, Inc. American Airlines Information Management System: Development, history, and return on investment. Time Sharing Today 3, 4 and 5, 1-15, 1972.
- Tagiuri, Renato, "Value Orientations and the Relationship of Managers and Scientists," Administrative Science Quarterly, Vol. 10, No. 1, pp. 39-51, 1965.
- Takatsuki, T., et al. "Packet Switched Network in Japan." American Federation of Information Processing Societies Conference Proceedings, 1977 National Computer Conference, Vol. 46, pp. 615-621, 1977.
- Tanskik, David A., "Environmental Influences on Organizational Behavior Regarding the Implementation of Operations Research/Management Sciences Research Recommendations," Unpublished Master's Thesis, Northwestern University, June 1968.
- Taussig, John, "EDP Applications for the Manufacturing Function", American Management Association, Research Study #77, 1966.
- Taylor, D. W., "Decision Making and Problem Solving," In: Management Decision Making, L. A. Welsh and R. A. Cyert (Ed.) penguin, 1970.
- Taylor, Ronald, "Nature of Problem Ill-Structuredness: Implications for Problem Formulation and Solution", Decision Sciences. Vol.5, pp. 632-643, 1974.
- Terrell, D., "Neighborhood Computer Stores-The Answers to Microcomputer Marketing." American Federation of Information Processing Societies Conference Proceedings, 1977 National Computer Conference, Vol. 46, pp. 999-1004, 1977.
- Tesler, L., "Computer Networks.: People's Computers, Vol. 6, No. 2, pp. 15-17, 1977.
- Toffler, Alvin , Future Shock, New York: Random House, 1970.

Vaughan, James and Avner Porat, Banking Computer Style: The Impact of Computers on Small and Medium Sized Banks. Englewood Cliffs, N. J.: Prentice Hall, 1969.

Vazsonyi Andrew, Decision Support Systems. The New Technology of Decision Making? Interfaces Vol. 9, No. 1, 1978.

Vazsony Andrew, "The Art and Science of Model Interpretation," Northeast AIDS Proceedings, Albany, N.Y., April 28-30, pp. 54-66, 1977.

Vertinsky, I., R. T. Barth, and V. F. Mitchell. "A Study of OR/MS Implementation as a Social Change Process." In R. L. Schultz and D. P. Slevin, Implementing Operations Research/Management Science, pp. 253-272. New York: American Elsevier, 1975.

Vertinsky, I., "OR/MS Implementation in Valle, Columbia, S. A.: A Profile of a Developing Region", Management Science, Vol. 18, #6, pp. B314-B327, 1972.

Vickers, Sir Geoffrey, The Art of Judgement, Basic Books, New York. 1965.

Vidale, M. L. and Wolfe, H. B., "An Operations Research Study of Sales Response to Advertising," Opns. Res. 5, 370-381, 1957.

Von Bertalanffy, Ludwig, General Systems Theory. New York: George Braziller, 1968.

Wagner, J. M. "The ABC's of OR." Operations Research, Vol. 19, No. 6, pp. 1259-1281, Oct. 1971.

Wagner, J. M., "A Managerial Focus on Systems Implementation." In P. G. W. Keen (ed.), The Implementation of Computer-Based Decision Aids. Cambridge, Mass.: Proceedings of a Conference Sponsored by the Center for Information Systems Research, M.I. T., April 3-5, 1975.

Wagner, J. M., Principles of Operations Research. Englewood Cliffs, N. J.: Prentice-Hall, 1975.

Wallenius, J., "Comparative Evaluation of Some Interactive Approaches to Multicriterion Optimization," Management Science, Vol. 21, No. 12 pp. 1287-1396, 1975.

Wallenius, J., and Zionts, S., "Some Tests of an Interactive Programming Method for Multivriterion Optimization and an Attempt at Implementation," Working Paper 75-3, European Institute for Advanced Studies in Management, Bussels, January 1975.

Ward, R. A., "More Implementation through an OR/Behavioral Science Partnership and Management Training", Operations Research Quarterly, Vol. 25, #2, pp. 209-218, 1974.

Turban, Efraim, Some Determinants of the Use of Mathematical Models in Plant Maintenance, unpublished Ph.D. thesis, University of California, Berkeley, June 1966.

Turban, Efraim "The Role of Information in the Implementation of Operations Research Techniques for Plant Maintenance Management," Working Paper No. 183, Center for Research in Management Science, University of California, Berkeley, August 1966.

Turban, Efraim , Some Determinants of the Use of Mathematical Models in Plant Maintenance, Chicago: Albert Ramond and Assoc., 1967.

Turban, Efraim , "A Sample Survey of Operations Research Activities at the Corporate Level", Operations Research, Vol 20 pp. 708-721, 1972.

Turing, A.M., "Can a Machine Think" in The World of Mathematics, Simon and Schuster, New York, 1956.

Turner, Merle B., Psychology and the Philosophy of Science, Appleton-Century-Crofts, New York, 1968.

Tytherleigh, Brian , "ORACLE: A General Purpose Planning and Control system", paper presented at the Man-Computer Interaction in Planning and Control Seminar, Cologne, March, 1973

Urban, G. L., "SPRINTER: A Model for the Analysis of New Frequently Purchased Consumer Products," Sloan School of Management Working Paper 364-69, MIT, Cambridge, Mass., 1969.

Urban, G. L., "SPRINTER Mod III: A Model for the Analysis of New Frequently Purchased Consumer Products," Opns, Res. 18, 805-854 , 1970.

Urban, G. L., "Building Models for Decision Makers," Interfaces 4, 1-11, May 1974.

Urban, G. L., "A Model for the Management of a Family Planning System." Operations Research, Vol. 22, No. 2, pp. 104-233, March-April 1974.

Urban, G. L. and Richard Karash , "Evolutionary Model Building", Journal of Marketing Research, Vol. 8, pp. 62-66, 1971.

Urban, G. L., "An Emerging Process of Building Models for Management Decision Making". Sloan School of Management, MIT, Working Paper #592-72 , 1972.

Vacchino, R. B., Strauss, P. S. and Hochman, L., "The Open and Closed Mind: A Review of Dogmatism," Psychological Bulletin, Vol. 71, No. 4 (1969), pp. 261-73 , 1969.

Van Horn, Richard , "Empirical Studies of Management Information Systems", Data Base, Vol 5, Winter 1973, pp. 172-180, 1973.

Vannoy, J., "Generality of Cognitive Complexity-Simplicity as a Personality Construct," Journal of Personality and Social Psychology, Vol. 2 , pp. 385-96, 1965.

- Weizenbaum, J., Computer Power and Human Reason. San Francisco: Freeman, 1976.
- Whisler, T. I., Information Technology and Organizational Change. Belmont, Calif.: Wadsworth, 1970.
- Whisler, T. I., The Impact of Computers on Organizations, New York: Praeger Press, 1970.
- Wiener, N. Cybernetics or Control and Communication in the Animal and the Machine. Cambridge, Mass.: M. I. T., 1948.
- Wiest, J. D., "Heuristic Programs for Decision Making." Harvard Business Review, Vol. 44, No. 5, pp. 129-143, Sept.-Oct. 1966.
- Winston, P. H., Artificial Intelligence. Reading, Mass.: Addison-Wesley, 1977.
- Winograd, T. Understanding Natural Language. New York: Academic, 1972.
- Williams, James and Mitroff, Ian I., "Methodologies in Search of Information Science Problems," Journal of the American Society of Information Science.
- Wildavsky, A., The Politics of the Budgetary Process. Boston: Little, Brown, 1964.
- Wilensky, H. L., Organizational Intelligence. New York: Basic Books, 1967.
- Winograd, Terry, Procedures as a Representation of Data in a Computer Program for Understanding Natural Language. Artificial Intelligence Laboratory, Project MAC, MIT, Technical Report #17, 1971.
- Withington, F. G., "Five Generations of Computer Use." Harvard Business Review, Vol. 52, No. 4, pp. 99-108. July-August 1974.
- Witkin, A. A., "Origin of Cognitive Style," in Scheere (ed.), Cognition: Theory, Research, Promise, Harper and Row, New York, pp. 172-205, 1964.
- Wynne, B. E., Sr., "A Pattern for Reporting Operations Research to The Business Executive," Address to the Seventh International Meeting of TIMS, New York City, October 1960.
- Woolsey, R. E. D., "Operations Research and Management Science Today, or, Does an Education in Checkers Really Prepare One for a Life of Chess?" Operations Research, Vol. 29, No. 3, pp. 729-737, May-June 1972.
- Woolsey, R. E. D., "The Measure of MS/OR Applications or Let's Hear It for the Bean Counter." Interfaces, Vol. 5, No. 4, pp. 66-69, August 1975.

Woolsey, R. E. D., "Prolegomena on Promoting Practice," Interfaces, Vol. 8, No. 3, 1978.

Yavitz, Boris, Automation in Commerical Banking: Its Process and Impact. New York: Columbia University, 1967.

Young, Lawrence G., Another Look at Man-Computer Interaction, Interfaces, Vol. 8, No. 2 February 1978.

Zajonc, R., "The Process of Cognitive Tuning in Communication,: Journal of Abnormal and Social Psychology, Vol. 61, No. 2, pp. 159-67, 1960.

Zand, D. E., and Sorensen, R. E., "Theory of Change and the Effective Use of Management Science.: Administrative Science Quarterly, Vol. 20, No. 4, pp. 532-545. Dec. 1975.

Zangwill, W. I., "Media Slection by Decision Programming," J. Advertising Res. 5.30-36, Sept. 1964.

Zeleny, M., Linear Multiobjective Programming. Berlin: Springer-Verlag, 1974.

Zionts, S. and Wallenius, J., "An Interactive Linear Programming Method for Solving the Multiple Criteria Problem," Working Paper, European Institute for Advanced Studies in Management, Brussels, March 1974.

Zionts, S., and Wallenius, J., "An Interactive Programming Method for Solving the Multiple Criteria Problem." Management Science, Vol. 22, No. 6, pp. 652-663, Feb. 1976.

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